MARINE REVIEW

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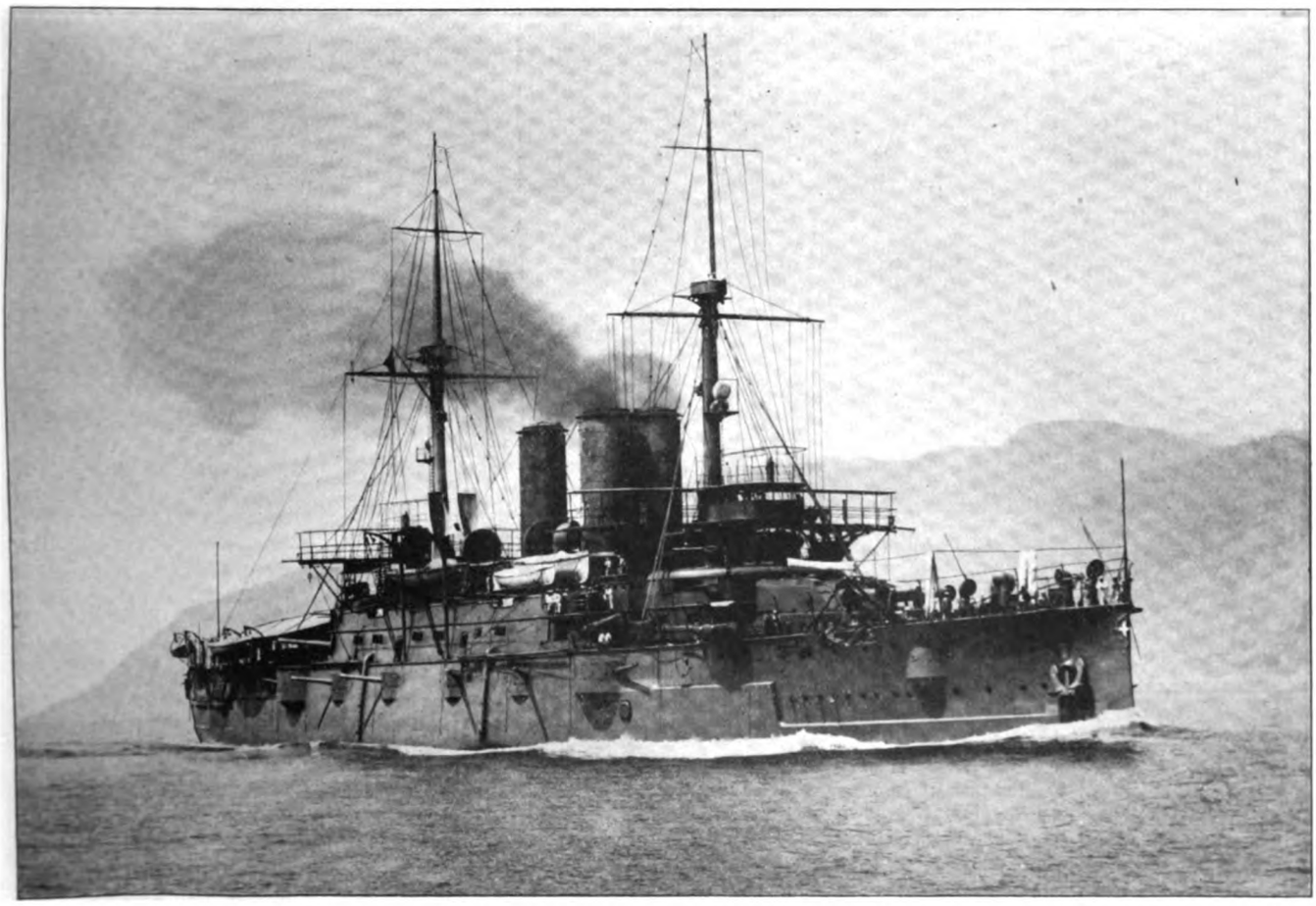
Machinery of the Italian Battleship Regina Margherita.

The Italian warship Regina Margherita has just completed her official contract steam trials and has attained most satisfactory results. She is a battleship of 13,430 tons displacement, 427 ft. long, 78 ft. beam and 27 ft. draught, built at the royal dock yard of Spezia. The machinery was constructed by the firm Gio. Ansaldo, Armstrong & Co. of Genoa at the engineering works in Sampierderena. The machinery consists of two main engines fitted with all the necessary auxiliary engines, steam being supplied by twenty-eight Niclausse water-tube boilers. Each set of engines is placed in a separate engine room, divided by a longitudinal watertight bulkhead and each engine room is, in all respects, exactly similar and entirely independent of the other.



ITALIAN BATTLESHIP REGINA MARGHERITA.

The boilers are placed in six separate rooms, forward the

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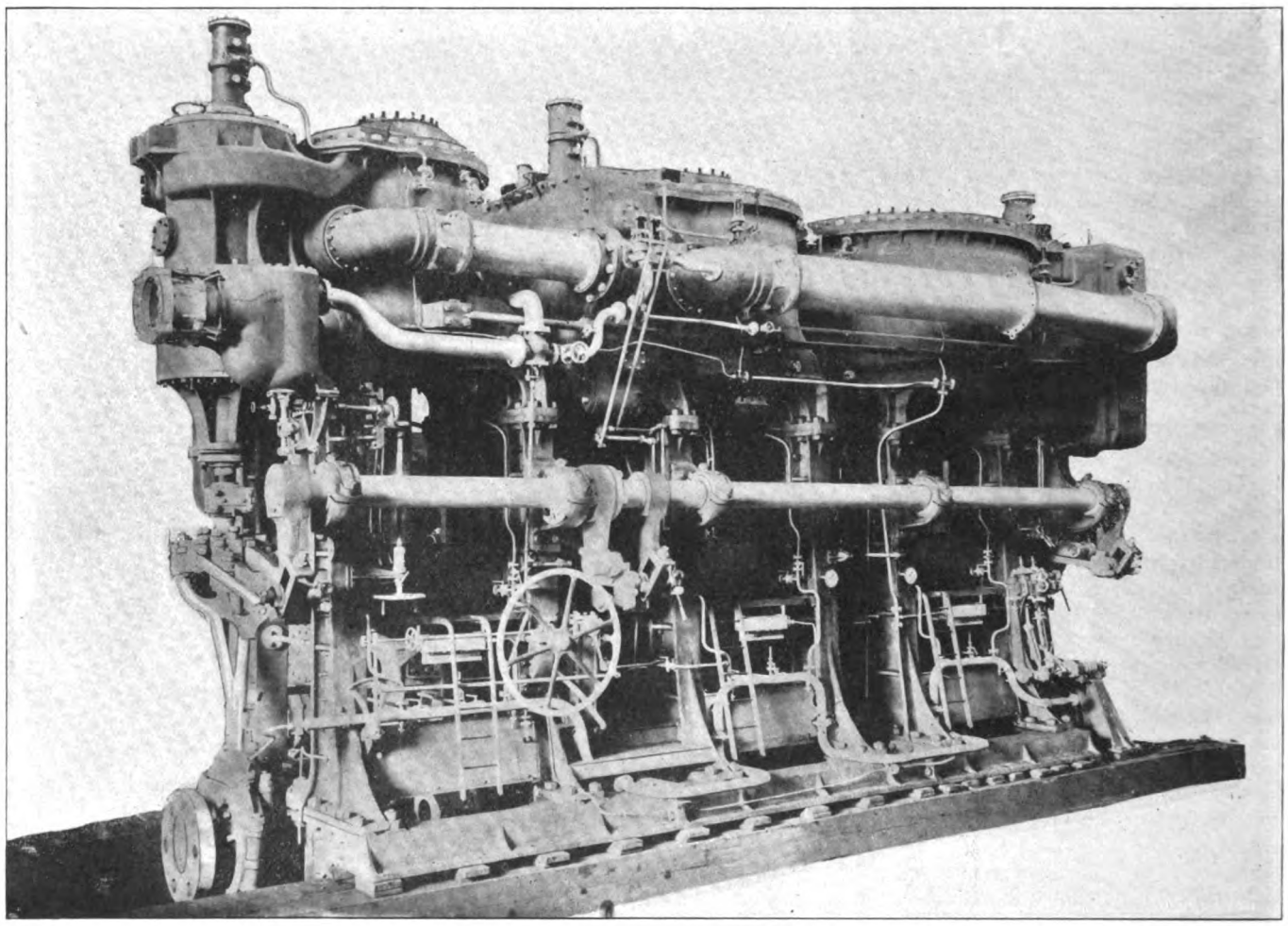
engine rooms, three in port side and three in starboard side divided by a longitudinal watertight bulkhead. The working pressure of the boilers is of 300 lbs., being reduced to 250 lbs. at the engine rooms.

The main engines are of the four-cylinders, triple-expansion type, the diameter of the cylinders being 37 in. for the high pressure, 60¼ in. for the intermediate, and 69¼ in. for the two low-pressure cylinders; the stroke is 47¼ in. The engines are balanced on the Schlick system, the two low-pressure cylinders being in the center, and the high and intermediate cylinders at the ends, and here it may be said that the balancing proved most effective. Stephenson link-motion



ENGINES OF THE ITALIAN BATTLESHIP REGINA MARGHERITA.

is adopted for working the valves, which are piston type on the high and intermediate pressure cylinders, and of the double-ported flat design on the low-pressure cylinders. The reversing gear is all round type, fitted with a double-cylinder engine. The screws are inward turning and the starting platforms are in the center of the ship.

The cylinders are independent castings: the two low-pressure cylinders form a solid body with the low-pressure receiver placed between the two low-pressure cylinders; the high and intermediate cylinders are each secured to the low-pressure cylinders by flanges and bolts. Each cylinder is supported by two cast steel columns in the front side and by one cast steel diaframe at the back. The bedplates are of cast steel. The pistons, cylinders and steam chest door are of cast steel. The piston rods and connecting rods are of Siemens-Martin steel; the connecting rod body of the low-pressure cylinders are hollow for balancing purposes. White metal is fitted in the bearings of the connecting rod gudgeons and crank pins, and it was very successfully tried. Each cylinder is fitted with a cast steel slipper lined with white metal on rubbing surfaces; the guide bars are of cast iron, bolted on the back standards.

The crankshafts are hollow, and each consists of four interchangeable pieces, 18 5-16 in. in external diameter, both at journals and at the crank-pins. Each crank-pin is 20⅞ in. long; each engine has eight main bearings, with a collective length of 13 ft. 8 in. The thrust shafts have external diameter of 18 5-16 in.; the thrust block are of the horseshoe type, with a collective surface of 15 sq. ft. The propeller shafts are 18 5-16 in. in external diameter. All crank, thrust and propeller shafts are of best mild steel. The propellers are three bladed; they have a diameter of 18 ft. 8½ in. and pitch 19 ft. 8¾ in. The bosses are of gun metal and the blades are of manganese bronze.

The main condensers are two separate and placed in the wings; they are cylindrical with shells of sheet brass, doors and tube plates of gun metal; the total cooling surface is 20,500 sq. ft. The water is supplied by four circulating pumps, each being driven by an independent compound engine; the pumps have a face of 43⅜ in. in diameter, and are each capable of discharging 1,000 tons of water from the bilge per hour. The main air pumps are four, worked by the intermediate and aft low-pressure cylinders, 26 in. in diameter and 20½ in. in stroke; there are also two auxiliary air pumps for keeping the wide in the main condensers when the main engines are at rest; they are Blake type, 10¼ in. in diameter and 8 in. in stroke.

The exhaust steam from the whole of the auxiliary ma-

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chinery in the ship is led into the auxiliary exhaust pipes, which are connected both with the atmosphere by the auxiliary exhaust pipes carried up the funnel, and with the respective auxiliary condensers in either engine rooms. Each of these condensers has its own air and circulating pump entirely independent of those for the main condensers, and they are driven by independent engines. The combined cooling surface of these two auxiliary condensers is 2,400 sq. ft., and their tube casings, like those of the main condensers, are of sheet brass.

Besides the auxiliary engine already noticed, two double cylinder turning engines are conveniently placed on the aft columns for the purpose of turning the main engines. This is effected by a set of compound worm gearing; these engines are capable of turning the main engines completely round in seven minutes with a steam pressure of 100 lbs., and a hand gear has also been arranged for the same purpose.

There are also several auxiliary engines in the main engine rooms to which reference may be made here and before we enter upon a description of the boilers. The distilling machinery for the purpose of furnishing fresh water for the boilers consists of four sets of Ansaldo evaporators with pumps complete, capable of furnishing collectively 80 tons of fresh water per day.

There are four large vertical fire and bilge duplex pumps, two bilge hand pumps, two oil hand pumps, two electric fans and four electric extractors for the purpose of aerating the engine rooms. The drain water service consists of four tanks, two in the engine rooms and two in the boiler rooms, which collect all the drain water of the main and auxiliary engines, steam pipes, etc.; two steam pumps are fitted in the engine rooms for discharging the drain water from the tanks into the hotwells or overboard.

There are in the engine rooms two hotwell tanks and two feed tanks; in the hotwell tanks discharge all the main and auxiliary air pumps. Two hotwell pumps draw the water from the hotwell tanks and discharge into the feed tanks through the filtering apparatus consisting of four sets of Harris filters.

As already stated the boilers are of Niclausse water-tube type; there are twenty-eight Niclausse boilers; each boiler has No. 15 headers with No. 18 tubes, and therefore are collectively No. 420 headers with No. 7,560 tubes. The tubes have the outside diameter of 3¼ in., and the length of 7 ft. 10½ in.; the headers are of malleable cast iron; the tubes are of steel solid drawn. Each boiler has one fire box and three fire doors. The aggregate heating surface of the twenty-eight boilers is 50,310 sq. ft., and the total grate area is 1,555 sq. ft. There are three smoke pipes of the height of 92 ft. from the grate bars.

The boiler rooms are arranged for the assisted draught in closed stokehold but non-airtight; the maximum air pressure admitted is of ¾ in. The air pressure is furnished by twelve electric fans. Twelve electric ash-hoisting engines, with electric brake and automatic stop gear are also fitted for removing ashes from each of the stoking platforms and discharging them overboard.

The feed arrangement for supplying the boilers comprises a main and auxiliary system of pumps and pipes, which are separate and independent of each other. There are six main feed pumps and six auxiliary feed pumps, all of the same sizes, of duplex type, fitted in the boiler rooms. All the pumps draw from the feed tanks and from the reserve tank; the main feed pumps discharge into the boilers through the automatic feed regulators; the auxiliary feed pumps discharge into the boilers through the hand regulating feed valves.

The main steam supply is conveyed by six lines of steel steam pipes, three lines being arranged on each side of the longitudinal central bulkhead, and corresponding each to one of the six boiler compartments. These lines are each entirely independent of the other, as are also independent the connecting pipes from the boilers of each of these lines. The port lines lead to the separator in the port engine room, and behind to the main steam pipe of the port engine, as the starboard lines lead to the starboard engine; but transversal branch fitted with stop valve allows to furnish steam each main engine from any boiler. Any boiler may be cut off from the system without interfering with the performance of the others in the compartment, as may also be cut off any compartment, from which one of these main steam pipes lead, without affecting the efficiency of the other compartments.

The machinery is fitted with all the latest apparatus usual in vessels of this class; we enumerate here the Molinari's electric counters, and the Perroni's automatical signaller for regulating the rate of firing, which was found very useful. The total weight of machinery complete including water in the boilers is 1,550 tons.

The official trials took place in the gulf of Genoa last July, and it may be said at the outset that they have proved eminently satisfactory. The Italian government was represented by Rear Admiral Annovazzi, Com'dr Viale, Col. Valsecchi, Maj. Traverso, Capt. Quarleri of the Royal Naval Corps of Constructors; Maj.-Engineer Pinto, and Captain-Eng. Palestino; the firm was represented by Com'dr A. Omati, the manager of Messrs. Ansaldo Armstrong & Co. engineering works at Sampierdarena, and by M. Vallino, chief engineer of the mechanical drawing office. The contract fixed one 6 hours' steam trial at 16,000 I. H. P. with natural draft and coal consumption not superior at 1.87 lb. per indicated horse power; and one 1½ hours' steam trial at full power of 19,000 I. H. P. with assisted draft at an air pressure not superior at ⅜ in.

The first trial at natural draft took place on July 16, 1904; the mean power developed during the 6 hours' run was 17,782 I. H. P.; the coal consumption was of 1.84 per indicated horse power hour.

The second trial at assisted draft took place on July 21, 1904, the mean power developed during the 1½ hours' run was 20,664 I. H. P. with an air pressure of 3-16 in., and a coal consumption of 1.98 lb. per indicated horse power hour. In both the trials all the main and auxiliary engines worked very satisfactory and the boilers produced very easily the steam supply.

The results of the two trials may be tabulated:

Report of 6 hours' coal consumption steam trial at 16,060 I. H. P. at natural draft of R. I. S. Regina Margherita in gulf of Genoa, July 16, 1904:

Draught of water		Forward 27 ft.	Aft. 27 ft.
Steam pressure in boilers			261 lb.
		Starboard.	Port.
Vacuum		26.5 in.	26.3 in.
Revolutions per minute		115.4	114.6
Steam pressure at I. P. receivers		235 lb.	230 lb.
Indicated Horse-power	High	2,800	2,750
	Intermediate	3,038	2,080
	Low forward	1,550	1,537
	Low aft	1,609	1,548
Mean total I. H. P.		8,967	8,815
Mean collective I. H. P.			17,782
Speed of vessel			19.3 knots
Coal consumption per I. H. P. per hour			1.84 lb.

Report of 1½ hours' full power steam trial of R. I. S. Regina Margherita in gulf of Genoa, July 21, 1904:

Draught of water		Forward 27 ft.	Aft 27 ft.
Steam pressure in boilers			279 lb.
		Starboard.	Port.
Vacuum		26.1 in.	26.3 in.
Revolutions per minute		120.8	121.2
Steam pressure at the I. P. receivers		242 lb.	240 lb.

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Indicated Horse-power	High	3,108	3,218
	Intermediate	3,375	3,371
	Low forward	1,894	1,905
	Low aft	1,889	1,908
Mean total I. H. P.		10,262	10,402
Mean collective I. H. P.			20,664
Mean air pressure in stokeholds			3-16 in.
Speed of vessel			20.2 knots
Coal consumption per I. H. P. per hour			1.98 lb.

Before concluding this description we would note that the whole machinery was constructed in the shops of the firm Gio. Ansaldo, Armstrong & Co., so the main and auxiliary engines and the Niclausse boilers were constructed in the mechanical works of the firm in Sampierdarena; all the cast steel pieces for the engines and malleable cast iron pieces for the boilers were furnished by the steel works of the firm at Cornigliano; the propellers and bronzes generally were furnished by Delta works of the firm at Cornigliano; and finally the electric motors for the fans, extractors, ash-hoisting engines, etc., constructed at the electrical works of the firm at Cornigliano.

LIVERPOOL SHIPPING LETTER.

Liverpool, Sept. 5.—The conference between the representatives of the Cunard, White Star, and Continental lines which was held at Frankfort-on-Maine on Aug. 29 with a view to a settlement of the differences which brought about the war of rates in the North Atlantic passenger trade has proved abortive, but there are grounds for the belief that the negotiations, although ended so far as the Frankfort conference is concerned, are not finally closed. Indeed, it is stated on what seems to be good authority that further conferences will probably be held at Paris or London, but on this point nothing official can be ascertained. The general feeling here in shipping circles, however, seems to be that an arrangement will eventually be come to, because the present state of things is simply suicidal. There are rumors that at least proposals for the basis of an agreement were laid down by the Cunard Line and by the Continental lines, at that point now at issue is the modification of these opposite platforms into such a compromise as will be acceptable to all parties. That the German and Cunard lines met in conference at all points to the fact that both are anxious to end a struggle which is causing great loss to every transatlantic shipping company, whether they are concerned or not in the dispute. Still the opinion has been expressed that the Germans are far more concerned as to a settlement than any of the other lines, because their losses must be so enormous. The idea of the Hamburg-American Co. in initiating the war was doubtless with the view of crippling the Cunard company, and forcing them to yield their monopoly contract for the American emigrant traffic to and from Austro-Hungarian ports, but the result so far seems to have been that the Cunard Line have been enabled to give more than blow for blow. Furthermore, the Germans, if rumor be true, are not only losing in regard to the reduction of their own rates, but also by having to guarantee the combine lines in regard to the losses they are sustaining in cutting their steerage rates to such a low level. But while this is one view, another is that probably the ultimate settlement will be something in the nature of a transference of the Cunard Austro-Hungarian traffic, either partly or wholly to the Germans. Already it is reported than an offer has been made by the Germans to purchase the Cunard vessels engaged in the trade at their first cost price and give $500,000 for the good will of the business. Until some settlement is come to, however, the disastrous war will continue with probably further rate-cutting in the near future. Although the White Star Line and others associated in what is called the American combine, have cut their fares to the low figures of $6 and $7 for westward steerage passages, they point out that this has only been done as an act of self defense to meet the cutting tactics of the Continental lines on the one hand, or the Cunard Line on the other. The same applies also to the other independent British lines to America and Canada. In regard to the Atlantic freight traffic, it is satisfactory to be able to state that there is an improvement in freight rates, and that in consequence one Liverpool vessel of large size, which has been laid up for some time, is being brought out for service again.

The cargo service established a week ago between London, Liverpool and Glasgow, and Fiume and Trieste, by the Hamburg-American Line is claimed not to be due to German hostility to the Cunard Line, but as a legitimate bid for trade. It will not, therefore, so I am informed by Messrs. W. Thomas & Co., the Liverpool agents of the service, be suspended at the termination of the rate war, as seems to have been the impression in some quarters. Reference to the Hamburg-American company reminds me that there is at present building at Messrs. Harland & Wolff's yard, Belfast, a 19,000-ton vessel for this line, which is to be ready in about eighteen months' time. Her internal fittings will be largely modeled on those of the White Star liner, Baltic, Capt. Sanchie, a prominent official of the German Line having just inspected the Baltic in Liverpool and obtained permission from the White Star company to utilize whatever arrangements he saw on that great liner. The new German liner is to have a restaurant on the upper deck, and also a gymnasium.

The Liverpool Underwriters' Association in their monthly list of casualities to vessels of 500 tons gross and upwards during the month of August, show that there were totally lost four British steamers of 5,691 tons, and four British sailers, of 6,426 tons, compared with two steamers of 4,734 tons, and one sailer of 2,631 tons in August, 1903; also eight foreign steamers of 9,494 tons, and three foreign sailers of 2,353 tons, compared with four steamers of 7,428 tons, and seven sailers of 6,197 tons in August, 1903. The vessels partially lost were 31 sailers, and 149 steamers (British), and 25 sailers and 162 steamers (foreign). The total number of casualties during August was 386, compared with 392 in August, 1903, 304 in August, 1902, and 348 in August, 1901. The casualties last month included 129 collisions, 124 strandings, 54 weather damage, 43 damage to machinery, shafts and propellers, 20 fires and explosions, and two vessels (both foreign) missing.

Messrs. Elder, Dempster & Boy's handsome new steamer, Port Kingston, sailed last week from Bristol on her maiden trip to the West Indies. The passengers included Dr. Graham Little, the first of fifty physicians which Sir Alfred Jones, the head of the Elder, Dempster company has invited to gratuitously make a voyage to report on the healthiness of the climate and its special suitability for consumptives. Sir Crichton Brown and several other physicians are going out by the next steamer a fortnight hence. I may add that Sir Alfred Jones, who is ever to the front in the extension of British commercial enterprise, has purchased 60,000 acres of land in Sierra Leone, for the purpose of cotton cultivation. The land will be worked in conjunction with the British Cotton Growing Association, and as there is abundant native labor available at a cheap rate, it is expected that the quantity of cotton to be derived from this extensive territory will be very considerable. Sir Alfred Jones has also acquired the Ilaro estates in Lagos, which extend to 50 square miles for cocoa and cotton growing.

The trial trip has been run this week of the steamer Portia, built by Messrs. Murdoch & Murray to the order of Messrs. C. T. Bowring & Co., Ltd., of Liverpool. The vessel which

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has been built for the Royal mail coast service of Newfoundland, is of a very handsome appearance, having a neat cutwater stern, and the passenger accommodation and outfit are of the most complete description. On her trials she exceeded her guaranteed speed of 12 knots by nearly half a knot. The Portia sails for Newfoundland under the command of Capt. Kean, and will be followed in three weeks' time by her sister ship the Prospero. It may be added that from the date of contract, till the date of delivery, only five months have elapsed.

The meeting this week of the committee of the International Union of Sailing Ship Owners has brought forward evidence that everyone is satisfied with the progress of affairs. One effect of the combination has been felt in the falling off in undue competition among sailing ship owners themselves, the want of union in the past leading to absurdly low offers of tonnage. The resolution to make no change in the minimum rates of freight, although in some trades an increase would under present circumstances be justifiable, will, it is felt, convince shippers that the union is in no sense aggressive. A pleasant piece of news, showing the undoubted success of the union, was placed before the committee by Mr. R. W. Leyland of Liverpool, the founder of the union. The news is contained in the fortnightly report by Messrs. Rogers & Co. of Valparaiso and Glasgow as follows: "There is at present a block for season's loading. Shippers (at Valparaiso) are beginning to realize the meaning of the union of ship owners. It will be interesting to watch developments during August and onwards. The minimum rate fixed will be obtained, with in all likelihood an increase." Such a statement coming from shippers themselves is a striking proof of the success of the union. The whole of the sailing ship tonnage of the principal European countries is not yet in the union, but no anxiety is felt on this account, events so far proving that the owners who are combined are practically masters of the situation. The next meeting of the committee was fixed to be held in Paris on Tuesday, Nov. 29.

The new harbor of Heysham on the west coast of Lancashire, which has been constructed at a cost of $10,000,000, has been officially opened this week. The whole scheme which has been carried out by the Midland Railway Co., covers about 500 acres, and possesses great advantages. Large vessels can sail in and out at all stages of tides, the minimum depth at low water being over 17 ft., rising to 50 ft. The equipment of the harbor is most complete, and the company's own steamers for Irish traffic are constructed on the newest principles. Some ten miles of sidings have been laid for dealing with traffic. There will be daily sailings to and from Belfast and Dublin, with express train service to all important railway centers. Another British railway company is going in largely for ship owning. I understand that the negotiations between the Goole Steam Shipping Co., Ltd., and the Lancashire & Yorkshire Railway Co. for the sale of the former undertaking to the railway company have been completed. The purchase price is approximately $13,000,000, including the buildings, warehouses, and plant at a valuation. The Lancashire & Yorkshire railway thus acquire eighteen steamers.

Liverpool commercial men are in entire agreement with the Liverpool Chamber of Commerce in its protest against the curtailment of the Liverpool United States consular district by the American government, and the addition of the separated portion to the Manchester district. It is felt that the prestige and trade of Liverpool will be effected if its consular rank is not restored intact by the American government. The trade between Liverpool and New York is the greatest between any two ports in the world. If the change was a convenience to shippers, the Liverpool Chamber of Commerce would not oppose it out of jealousy of the Manchester ship canal, or fear of a loss of prestige, but the shippers themselves, who in future must transact their business at Manchester are the strongest opponents of the change, because they have their offices in Liverpool, and they will have to remove those offices to Manchester. A memorial against the change has been addressed to the British foreign secretary for presentation to the United States government. The change is all the more difficult to understand, when it is stated that Manchester's export trade to the United States is declining. Compared with the corresponding month of last year, August exports to United States from Manchester showed a decrease in value of about $230,000. In July there was a decrease of $350,000 compared with July of 1903.

The Canadian Pacific Railway Co., it is stated here, intend at the close of the St. Lawrence river navigation to put some of their Atlantic liners on to the New Orleans and Galveston service.

I also learn that the London, Brighton & South Coast Railway Co. have contracted with the Fairfield Ship Building Co. of Glasgow to build a high speed turbine steamer for the New Haven and Dieppe service.

WORLD'S MERCHANT MARINE.

Recent statistics published in France estimate the total tonnage of the world's merchant marine at 33,643,000 tons, and the number of vessels at 24,853, of which 12,671 are steamships with 27,184,000 tons, and 12,182 are sailing ships with 6,459,000 tons. This gives an average of about 1,540 tons for steamers and 538 tons for sailing vessels. Although the construction of large ships has greatly developed during late years, the greater part of the world's goods is still carried by vessels of average tonnage. The number of ships of over 10,000 tons is only eighty-nine. Of vessels over 5,000 tons, the following table gives the number and the flag floated:

VESSELS OF OVER 5,000 TONS.

Flag.	6,000 to 7,000 tons.	7,000 to 10,000 tons.	More than 10,000 tons.
British	366	119	48
German	50	15	26
American	34	7	7
French	30	4	2
Dutch	6	1	4
Russian	10	2	...
Austrian	4	1	...
Japanese	16	...	...
Spanish	3	...	...
Danish	...	1	2

The tonnage of the principal countries is as follows: England, 16,000,374; America, 3,671,056; Germany, 3,283,247; Norway, 1,653,740; France, 1,622,016; Italy, 1,180,335; Russia, 809,648; Spain, 714,447; Japan, 726,818; Sweden, 721,116; Netherlands, 658,845; Denmark, 581,247; Austria-Hungary, 578,697; Greece, 378,199; Belgium, 157,047; Brazil, 155,086; Turkey, 154,494; Chile, 103,758; Portugal, 101,404; Argentina, 95,780.

It is reported from Duluth that Mr. A. B. Wolvin has obtained entrance into Duluth and Superior for the Soo Line railroad and that preliminary surveys for a line into the head of the lakes from Lake Smith, Wis. are now being made. The line has for a long time been anxious to obtain a share of the all rail haul from Duluth which at certain seasons is very important.

The Morse Iron Works, Brooklyn, N. Y., has been reorganized as the Morse Dry Dock & Repair Co. and is now in active operation for the repair of vessels. The new company has a working capital of $800,000. Mr. E. P. Morse is the general manager, while Mr. James E. Buckley has been appointed manager of the company's New York office at No. 17 State street.

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SCOTCH SHIPPING LETTER.

Glasgow, Aug. 31, 1904.—The Fairfield Ship Building & Engineering Co., Ltd., have launched the fleet scout, Forward, built for the British government. She is the first of two vessels they have on hand for this new class. The vessels are not expected to enter the fighting line but will serve as attendants to vessels of the fleet, and search out and convey information, for which they have lightness and speed. The Forward is 384 ft. long over all, and 39 ft. 2 in. wide, while her draught of water in normal load condition will be about 14 ft. Her displacement is 2,850 tons, and her speed 25 knots, with machinery developing 16,500 I. H. P. Her bunkers are capable of stowing coal with which she may steam a total distance of about 6,000 miles, at about 12 knots speed. She will be armed with ten 12-pounder guns and eight 3-pounders, together with two 18-in. deck torpedo tubes. Protection is afforded to the engines and boilers by a belt of 2-in. Krupp non-cemented armor, extending from 30 in. below the waterline to the upper deck, and across the vessel at each end of the machinery spaces, and by the upper deck of ¾ in. high tensile steel. Protection is given to the boilers by the coal, which is arranged in side and cross bunkers surrounding the boiler rooms, and reaching to the upper deck level. The magazines are protected by an armored deck extending well below the water-line. A feature of the design is the great weight of material devoted to strengthening the main structure of the hull, and the care taken to ensure that the parts contributing to longitudinal strength run continuously without loss of strength at the butts, and without abrupt changes of scantling. High tensile steel has been largely used, and the Forward will be one of the strongest war vessels ever constructed. She is designed with a full forecastle forward and a sunk poop aft, the former affording an elevated gun platform and ensuring dryness, while the latter gives roomy apartments for the accommodation of the officers. On the forecastle are three of the 12-pounder guns and a circular conning tower of 3-in. Krupp non-cemented steel, with navigating bridge, steering shelter, searchlight platform, chartroom, and captain's watch cabin above. Aft above the poop is another light bridge, and on each bridge are placed two of the 3-pounder guns. In the waist of the ship are four 12-pounder and four 3-pounder guns, and the two torpedo tubes, and on the poop deck are the remaining three 12-pounders. The total complement is 290 persons, including about 150 stokers and fifty seamen. The propelling machinery consists of two sets triple-expansion engines, in two watertight compartments, each set having four inverted cylinders working on four cranks, balanced on the Yarrow, Soblick and Tweedy system. Steam will be supplied by an installation of twelve water-tube boilers of the latest small tube type, designed for a working pressure of 260 lbs. The Forward has three funnels and a single mast, with light signalling yard and wireless telegraphy pole.

Dr. Francis Elgar, managing director of the Fairfield company, presided at the luncheon, and in proposing "Success to the Forward" said this was one of new type of vessel. They were somewhat of an experiment and chiefly intended to perform scouting duties. They would be, in a sense, the eyes of the fleet, and serve to obtain intelligence about other fleets. For that purpose they required to have very high speed, and so they had been made as small as was consistent with fast steaming at sea. Although the Forward was only the second of these vessels launched, the class had already been keenly criticised. A point upon which the Forward and her sister ship, both of which were built to the designs of the firm, differed from others of the class was that all the armor had been placed to one side of the ship. Admiral Wilson said that although the Forward was a new departure it really followed on an old rule, which was that you cannot put everything into one ship. Here they had sacrificed the big for the small vessel and secured high speed and a vessel that would be able to run away from anything that was bigger than herself. They called them scouts, but they were really the small cruisers of the future. The designing of ships by the contractors was a new thing, and they would all look forward to the results with great interest. Hitherto they had wondered how it was that contractors could build for foreigners ships which apparently steamed faster and carried more armament than our own ships. He had no doubt that these scouts would pass through their tests satisfactorily.

The new turbine steamer Loongana, built by William Denny & Bros., Dumbarton, for the New Zealand Steamship Co., has had her official trial on the Firth of Clyde. She has been put through most exhaustive trials and a mean speed of 20.14 knots secured, which will ensure a steady 18 knots being maintained on her run. The trial consisted of a cruise in Lochfyne, with a large and representative company on board. At the luncheon Mr. Peter Denny referred to the foresight and wisdom of the Union company in getting this, the first ocean-going turbine steamer, built. He gave a brief historical survey of the Union company and said this was the thirty-seventh vessel his firm had built for that company.

As to draught in relation to speed and depth of water, torpedo boat trials at very high speeds show the vessels squatted by the stern. The most frequent explanation is that the very fine form of the stern fails to support the vessel. It has however been realized that where the depth of water under the keel of a ship is small a vessel under way actually draws more water than when at rest. This is not influenced by the water being fresh or salt. It was thought that wave action in a canal of limited width produced this effect. That this is not so is proved by observations made on Transatlantic liners proceeding down the channel from New York. Observation of all liners, taking the draught at New York quays and at three points down the channel where depth and speed varied, show that in twenty-six vessels their draught was increased nine-tenths of a foot, both forward and aft, in a channel nearly 100 ft. deep, while in one 31 to 35 ft., giving only 7 to 3 ft. under the keel, the increase in draught was 2 ft. forward and 2 ft. 8 in. aft, and at Sandy Hook where speed was greater, without much more depth of water, the draught was greater by almost as much. The assumption is that squatting is greater in shoal water than in deep water. The squat increases with the speed and is varied by the lines of the ship, the finer form tending to deeper immersion.

Underwriters have again been suffering badly. Intelligence has been received of the stranding of the Liverpool steamer Mohican. She left Philadelphia on July 29 bound for Ibrail, with 3,000 tons of machinery and 300 tons of coal and is stated to be badly stranded on Kipez Point. The Mohican, which is valued at £25,000, is of 2,728 tons and was built at Sunderland in 1892 by J. L. Thompson & Sons and is owned by the North Atlantic Steamship Co., Ltd., which is managed in New York by T. Hogan & Sons. Another casualty is that to the floating dock owned by the Russian government, reported broken in two whilst being towed by the steamer Meteor from St. Petersburg to Libau. This dock, which was valued for the voyage at 200,000 roubles, although originally insured on the Continent, is largely reinsured in London. Reports of the British steamer Tenby which went ashore on a reef on the coast of Java are most unfavorable. She was bound with a cargo of sugar, insured for £60,000, from Java to European ports. It is feared that only 5 per cent of the cargo will be saved. Underwriters are also largely interested in the steamer Tymeric, of which the latest account is of very little hope of saving the vessel. This steamer, which is insured apart from her cargo for £35,000, was bound with nitrate, insured for £13,000, and other cargo also insured here, from the west coast of South America to the Continent.

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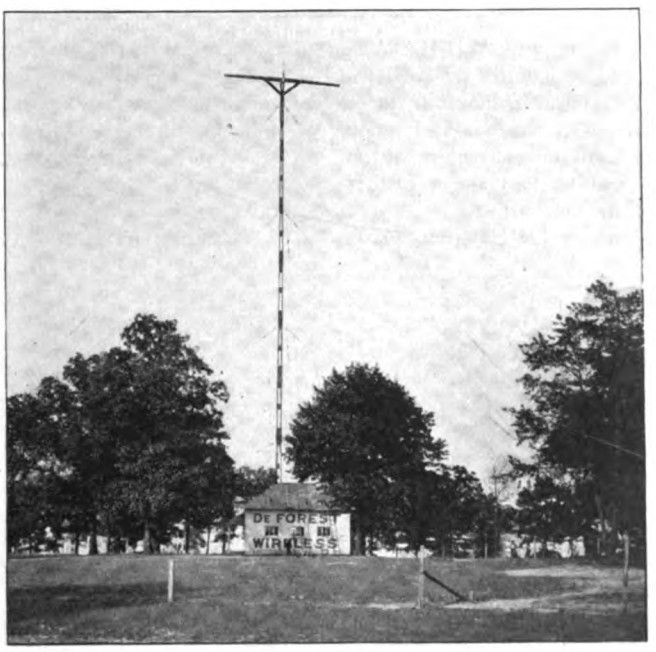
Progress of Wireless Telegraphy.

An infant, yet a giant; such is the unique position of wireless telegraphy at the present time, when the ramifications of its development are extending to every country of the earth and every sea. Its application to commercial uses is of but a few years growth; yet that growth has been by leaps and bounds and apparently there is no limit to its possibilities. One day we read of its application to railroad work, permitting a moving train to communicate with headquarters or a station along the line; the next we find the agricultural bureau planning to install a system of automatic fire alarms in the great western forests to give warning of approaching fires; again a press dispatch is flashed across the seas for hundreds of miles, despite intervening islands, and the men have read of a fierce naval battle far out at sea on the other side of the world, while the conflict was still raging.

Such feats are eminently in keeping with the spirit of the twentieth century. And yet, to the uninitiated, there is in them an element of the weird, the unbelievable. To a great mass of people wireless telegraphy is still more theory than practice; more dream than reality. It is a giant stride of science—and some of the people have not yet come abreast. A year or two more of successes, of spectacular achievements, and the continued daily application to commercial purposes, and wireless telegraphy will assume natural proportions in all eyes. It will, as the telephone and wire telegraph, become an essential component part of every-day life, and settle down to an ever-widening career of usefulness, that only time itself can limit or guage.

One important factor in every commercial science, particularly for its future prosperity, is recognition by the government. In this respect wireless telegraphy has been particularly fortunate, as was the wire telegraph. And a most notable and clear-sighted action on the part of the navy department was the contract for five wireless stations whose circuits will cover the waters of the Mexican gulf and Carribean sea and the greater and lesser Antilles. This contract was awarded the American DeForest Wireless Co. According to widely published press reports, "With the greatest care the government experts conducted most rigid tests, and reported that the DeForest system, already executing government contracts on a similar scale, was the one which offered the best service. During a period of several months seven wireless stations were in operation in the same magnetic field and yet long messages were received and transmitted by the DeForest system. This achievement, regarded by the government experts as the greatest in the history of the science, was possible only by the utilization of 'syntonic aerography,' in which Dr. DeForest's attuning apparatus is employed."

The contract with the government is reciprocal, which makes the company and the government, in a sense, allies, since commercial messages are exchangeable between all stations and ships equipped with the DeForest instruments, whether maintained by the government or by the company. This arrangement is a most happy settlement of the incipient controversy regarding government ownership of all coastwise wireless stations on grounds of public policy and welfare. Such a harmony agreement obviates the possibility of friction between private and government stations, because the two classes of stations, supplied with the DeForest tuning apparatus, are able to operate simultaneously in close proximity without interference. In other words, the art is reduced to the simplicity of the local Bell telephone exchanges where one may drop a connection and pick up another on a moment's notice.



AN ATLANTIC COAST WIRELESS STATION

It is scarcely possible that this question of government ownership will again arise, though the next session of congress will undoubtedly enact some legislation controlling future wireless installations, along the coasts, at least, and possibly interior stations. President Roosevelt several months ago appointed a general wireless board, composed of the active heads of the government departments and bureaus using wireless. Their object was to inquire into the relation of wireless to the government, particularly along the coasts, and to recommend legislation to congress. This report, which received the president's approval, is still in the hands of the government printer, and has not been made public in its entirety. It is known, however, that a recommendation is made to place wireless stations under the supervision of the department of labor and commerce, and through this department to license and keep track of every wireless station established. Such supervision would enable closest censorship during a state of war.

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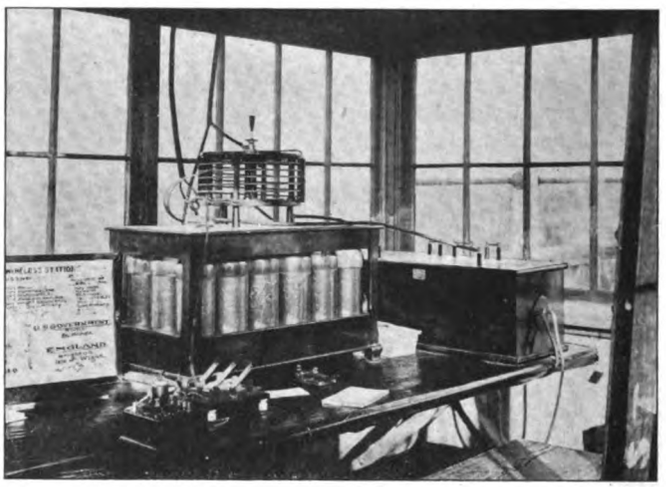
The points at which the large government stations are being established are: Pensacola, Key West, South Cuban coast, Porto Rico, Panama. Any one of these stations will be able to communicate with any other in the circuit. Herein is to be found a pertinent comparison of relative cost of wireless installations and land and cable lines. To install cables between each of these points would require a cable length of approximately 4,770 miles, which would cost, at the average of all the cables of the world, $7,500,000. The cost to the government at this instance is less than one-fiftieth of that amount.

The quick closing of this contract, the largest for wireless communication ever awarded, is admittedly due to the use of DeForest wireless by the London Times in reporting the Russo-Japanese war. The coasting steamer Haimum was equipped and a land station erected at Wei-Hai-Wei, a neutral English port and cable station. Darting around the scene of naval operations like a busy bee, the little Haimum was constantly in touch with Wei-Hai-Wei, and for many weeks during the early part of the war the only reliable news came by DeForest wireless. Soon the world was electrified at the startling announcement of the Russian government that the Times correspondent, Capt. James, who had passed safely through the Spanish and Boer wars, and the DeForest operators, would be hung as spies if caught. The Haimum was once actually boarded by officers of the ill-fated Bayan. But even as they were being boarded the Haimum operator was talking with Wei-Hai-Wei. His message was: "We are about to be boarded by the Russian battleship Bayan. If you do not hear from us in three hours inform the British and American consuls and London Times." The Russian officers read this message as it lay on the operator's table, and without waiting to make a further investigation, took their departure.



INTERIOR OF A DE FOREST WIRELESS STATION.

Later the Japanese government forbade the Haimum, whose news-gathering propensities were considered inimical to Japanese interests, to proceed into the theater of naval action. This restriction was also said to be due largely to the fact that the Japanese, using a metal filings coherer in their wireless instruments, found the greatest difficulty in effecting any sort of communication in the same magnetic field with the DeForest instruments, through continuous cohesion. The DeForest instrument is radically different, the messages being received through an electrolytic responder and telephone gear, with a speed limited only to the capacity of the operators. The filings coherer is slow, the process of cohesion and decohesion of the filings being necessary to produce every dot and dash in the Morse code.

A COAST WIRELESS STATION.

The London Times service was finally abandoned in July, 1904, but not before the Haimum equipment had served its purpose and pointed out clearly to the United States government the value of a system like the DeForest for Atlantic coast defense. It was in fact a demonstration for the whole world that wireless telegraphy is no longer theory but a factor to be reckoned with by governments and every branch of commerce.

Ten stations of the DeForest company have already been built along the Atlantic coast. They are located at Providence, R. I.; Quogue, Long Island; No. 42 Broadway, New York City; Highlands of Navesink, N. J.; Cape May, N. J.; Lewes, Del.; Hatteras, N. C.; Key West, Fla.; Havana; and Washington, D. C. The Atlantic DeForest Wireless Telegraph Co., headed by Charles C. Galbraith, formerly eastern manager for Armour & Co., is preparing to take over these stations from the parent American DeForest company, and to build others at every point of importance along the Atlantic and Gulf coasts from Maine to Texas. The Atlantic company is organized for purely operating purposes, a large interest being retained by the parent concern, in addition to royalties for use of instruments. The parent company manufactures all apparatus and owns all patents.

In the same manner the Great Lakes, Western and English DeForest companies have been and are being organized for operating purposes, the groups being organized on the same principle as the Bell Telephone companies, each company operating separately, exchanging business at points of contact and presenting a united front for its practically exclusive sea business and competing in many instances with land and cable lines.

It is not proposed to begin the equipment of coastwise vessels until circuits of land stations are complete. It will then be possible for the owners of any vessel in the coast trade to keep in touch with their captains from port to port; ships will receive storm warnings and "ball time," enabling skippers to regulate their chronometers a thousand miles from shore as easily as on land.

On the Central American coast, at Port Limon, C. R., and Bocas del Toro, Panama, two DeForest installations have done away with the old cable ship between these points and wireless communication is kept up day in and day out for months with much less trouble than even would be experienced with land wires. These stations are the property of the United Fruit Co., and are the nucleus for an extensive Central American and Mexican wireless system.

Another distinguishing achievement of the DeForest system

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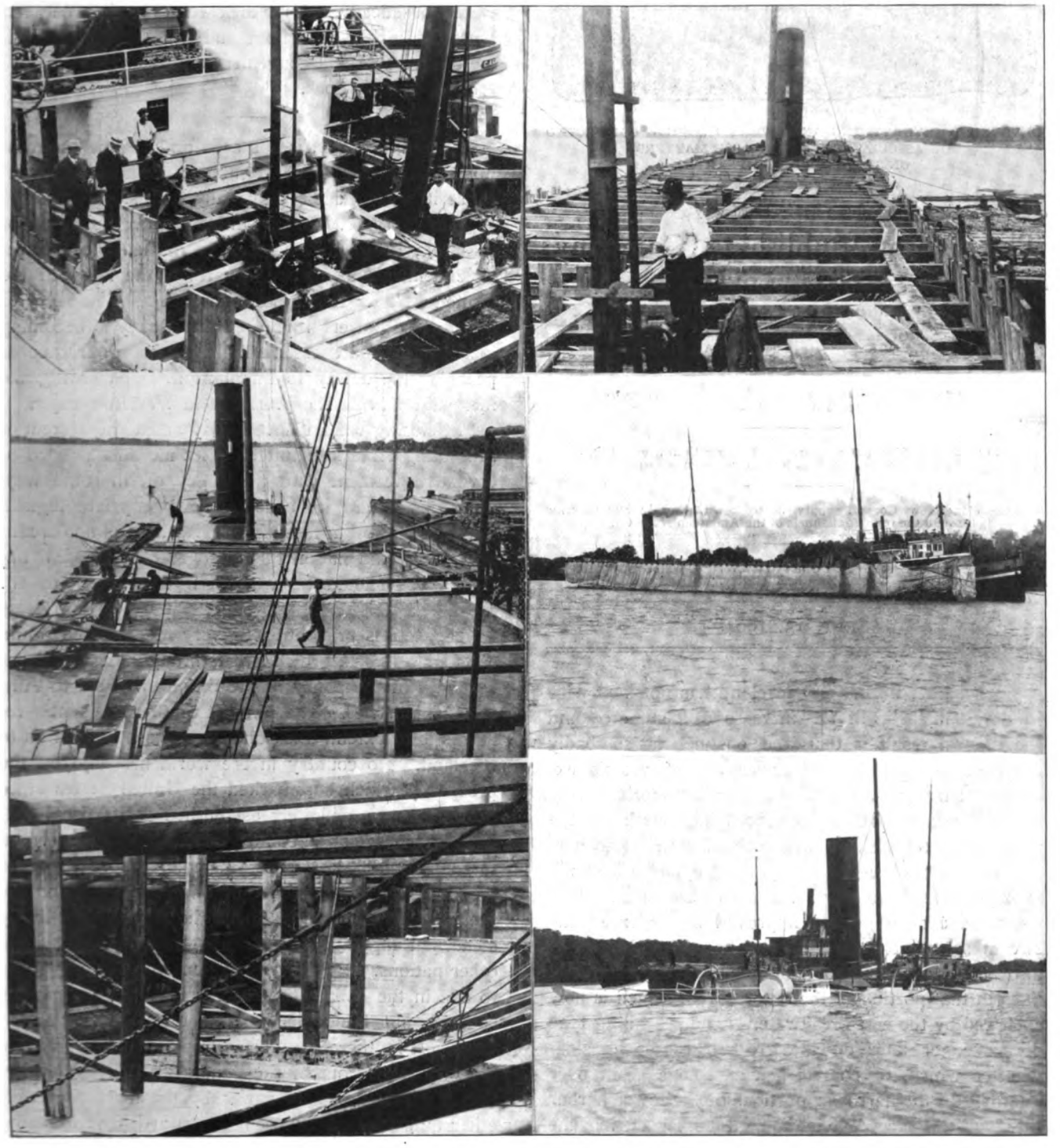
in coastwise wireless telegraphy is the communication established between Nome and St. Michaels, across Norton Sound, where a cable is impracticable. All other attempts at rapid communication had failed until Aug. 9, 1904, shortly after their installation, Gen. A. W. Greely, chief signal officer, U. S A., received a message direct from Nome. This traveled altogether 3,500 miles and for the first time the officials at Washington received a communication direct from the far north without the intervention of a foot messenger or a boat.

In addition to contracts for equipment of navy vessels with DeForest wireless the system is in use in various artillery districts, notably between Forts Wadsworth and Hancock, in New York harbor. The distance is a little more than 12 miles. This was the first wireless circuit in the world to replace a cable.

Altogether the DeForest system has fifty-two stations in operation or complete, and 423 in course of erection, contracted for or being arranged for.



THE WRECK OF THE CITY OP BERLIN OFF BELLE ISLE IN THE DETROIT RIVER AND THE RECOVERING OF HER, PHOTOGRAPHICALLY TOLD.

The Riverside Iron Works, Charleston, South Carolina, were the lowest bidders for constructing a wooden hull and installing machinery in the steamer Angler for the United States engineer at Savannah, Ga. The company's bid was $9,715 and it has been accepted.

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DEVOTED TO EVERYTHING AND EVERY INTEREST CONNECTED OR ASSOCIATED WITH MARINE MATTERS ON THE FACE OF THE EARTH.

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SEPT. 15, 1904.

The inner harbor of Cleveland has not kept pace in development with the increase of commerce and the natural result is that the channel is so badly crowded as to make the movement of vessels extremely hazardous. This condition is especially true of that portion of the harbor lying south of the Superior street viaduct, where the channel is so narrow that if two vessels are lying at opposite docks it is impossible for a third vessel to pass them. This condition can be greatly improved by widening the stream south of the viaduct. The congestion could also be lessened by providing facilities for passenger lines in that portion of the outer harbor which is now sheltered by the east breakwater. The prevailing type of passenger liner on the great lakes is the side-wheeler which, of course, has enormous beam over guards. In the narrower portions of the lower harbor these vessels block navigation altogether during the time that they are required to utilize that portion of the harbor. The passenger lines are quite willing to abandon the river altogether provided docking facilities are furnished them in the outer harbor. To this end a delegation of vessel men called upon the city authorities of Cleveland this week to ascertain whether a movement could not be started to utilize the outer harbor and from what can be gathered the administration seems well inclined to it. If Cleveland is to retain her place among the ports of the great lakes she will have to provide better accommodations for vessels. As for the passenger lines their interests would be best subserved in the outer harbor as it would practically reduce their running time between ports by fully half an hour and would also provide a more agreeable and convenient approach for the passengers to their dock.

"As for the navy, it has been and is now the most potent guarantee of peace, and it is such chiefly because it is formidable, and ready for us."

With these few words which, however, are full of meaning, President Roosevelt in his letter of acceptance defines his position regarding the navy of the United States. It is quite clear that he is in favor of a large and powerful navy. Such a navy is becoming increasingly more essential. The best guarantee of peace is the ability to maintain it. Concerning the merchant marine the president in his letter says:

"In closing what I have to say about the system of promoting American industry, let me add a word of cordial agreement with the policy of, in some way, including within its benefits by appropriate legislation, the American merchant marine. It is not creditable to us as a nation that our great export and import trade should be well nigh exclusively in the hands of foreigners."

This, too, is brief but it is very much to the point. This country has grown great through the beneficent influence of the policy of protection extended to American industries. The purport of the president's remarks is to extend this policy to the sea as well as to the land. No country in the world has enjoyed the prosperity which has marked the United States since protection was definitely established as its fiscal policy. Immense as the country is it has been developed to its remotest part in an incredibly short space of time through the influence of this policy. Of course the protective policy has made the standard of living somewhat higher in the United States than it is in other nations. It is useless to deny that it costs more to live in the United States than it does in any other country, but the added cost is offset by an added wage. It is, therefore, perfectly plain that if any one industry is left out of the general scheme of protection it must inevitably suffer by the mere fact that other industries are protected. An article whose product is chiefly labor must cost more in a country that is protected than in one which is not protected. The single item of the wage scale would make this so. This is especially true of ship construction which is almost entirely a matter of labor. The testimony submitted before the Merchant Marine Commission which has lately made a tour of the country to inquire into the state of American shipping in the foreign trade and to seek a remedy therefor is to the

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effect that a ship costs from 25 to 40 per cent. more to build in the United States than it does in Britain. By the same token after it is built it costs more to operate. This expensive article therefore, the American ship, cannot compete in a trade that is open to the ships of all nations unless favored in a manner to equalize the added cost of its construction and operation. There are various ways whereby the differential of this added cost can be adjusted but as the matter is now in the hands of the Merchant Marine Commission it would be unwise to advocate any one plan. Undoubtedly the report of the commission will be unanimous and will recommend some plan calculated to restore American shipping to the high seas. It is gratifying to note that the administration gives its cordial approval to this question. It is really one of the vital issues of the present campaign.

CHALLENGE CUP RACES.

The forthcoming races for the American Power Boat Association's challenge cup promises to be the most interesting contest of motor boats yet held in this country. The races, which are the result of the challenge of the Sporting Star of the Manhasset Bay Yacht Club, will take place on the Hudson river, off the Columbia Yacht Club's house, on Sept. 21, 22 and 23. The cup was won by the Standard of the Columbia Yacht Club in June. The Standard has since been sold out by the club and is not entered for the coming races. Besides the Sporting Star, twelve boats are already entered. It is said that the new Seabury boat, which was badly damaged on her trial trip last week, will be repaired in time to participate. Much is expected of W. K. Vanderbilt, Jr.'s new boat, which is said to have recently covered the measured course in Manhasset bay at the rate of 22 knots an hour. Following is the list of entries to date:

Boat.	Owner.	Club.
Mercedes IV	W. K. Vanderbilt, Jr.	American
Vingtetun II	G. S. Kilmer	Chippewa Bay
Shooting Star	H. A. Lozier, Jr.	Manhasset Bay
Marcerene II	J. W. Allison	Cape May
Mercedes II	H. L. Bowden	Rhode Island
Regina	S. L. Clayton	Philadelphia
Catch Me	J. F. Martin	Manhasset
Macaroni	C. H. Tangeman	Atlantic
Josephine	A. J. Buschmann	Jamaica Bay
Logarithm	F. M. Waterman	Sachem's Head
Cricket	Thomas Fearon	Yonkers
Challenge	Smith & Mabley	Audubon

FOUR-MASTED SCHOONER C. E. WILBUR LAUNCHED.

The four-masted schooner Charles E. Wilbur was launched with quite imposing ceremonies from the ship yard of M. B. Donald & Son, Mystic, Conn., last week, the ceremony being performed by Miss Ethel May Wilbur. The new schooner is 175 ft. long, 36 ft. beam and 13½ ft. deep. Like her sister ship, the Quinebaug, she is of the baldheaded type, that is to say, without top masts, and is the second craft of her sort to be built on the Atlantic coast, though the type is quite popular on the Pacific. She is of stout construction throughout and her ample freeboard and high bows give her an appearance of great seaworthiness. She has a cargo capacity of 1,100 tons of coal or 75,000 ft. of lumber. Her equipment is complete throughout. Her windlass was made by the American Ship Windlass Co. of Bath, Me. The engine and boilers were supplied by Rawson & Morrison, Cambridgeport, Mass., and the masts and other spars were supplied by the Sutton Spar Co. of Mystic, Conn. The keel will be laid at once in the berth left vacant by the Wilbur for a four-masted schooner for E. P. Boggs of Boston, Mass. Three other four-masters are now in the yard in various stages of completion.

SUMMARY OF NAVAL CONSTRUCTION.

The monthly summary of naval construction, issued by the bureau of construction of the navy department, shows commendable progress on all naval vessels. The battleship Connecticut, which is to be launched on Saturday of this week from the New York navy yard, is given as 47 per cent completed, while the Louisiana, her sister ship, launched a month ago, is given as 52 per cent completed. Following is the summary:

		Degree of completion, per cent. Aug. 1, '04.	Sept. 1, '04.
Battleships.			
Ohio	Union Iron Works	97	99
Virginia	Newport News Company,	63.7	66.8
Nebraska	Moran Bros. Company,	54.3	56.7
Georgia	Bath Iron Works,	59.3	63.3
New Jersey	Fore River S. & E. B. Co.,	63.8	66.4
Rhode Island	Fore River S. & E. B. Co.,	66.1	68.9
Connecticut	Navy Yard, New York,	47.3	50
Louisiana	Newport News Company,	52.59	56.5
Vermont	Fore River S. & E. B. Co.,	13.4	16.3
Kansas	New York S. B. Co.,	17.7	22.1
Minnesota	Newport News Company,	37.56	39.77
Mississippi	Wm. Cramp & Sons,	6.65	7.71
Idaho	Wm. Cramp & Sons,	6.50	7.47
Armored Cruisers.			
Pennsylvania	Wm. Cramp & Sons,	84.2	86.7
West Virginia	Newport News Company,	89.32	91.62
California	Union Iron Works,	62	63
Colorado	Wm. Cramp & Sons,	89.2	91.2
Maryland	Newport News Company,	86.87	89.16
South Dakota	Union Iron Works,	59	61
Tennessee	Wm. Cramp & Sons,	42.45	45.74
Washington	New York S. B. Company,	38	41.4
Protected Cruisers.			
Chattanooga	Lewis Nixon,	91.9	94.62
Galveston	Wm. R. Trigg Co.,	87	89
St. Louis	Neafie & Levy Company,	44.6	48.8
Milwaukee	Union Iron Works,	54	57
Charleston	Newport News Company,	79.5	81.4
Gunboats.			
Dubuque	Gas Engine & Power Co.,	52.7	58.4
Paducah	Gas Engine & Power Co.,	45.2	53.6
Training Ships.			
Cumberland	Navy Yard, Boston,	57	66
Intrepid	Navy Yard, Mare Island,	43.4	49.1
Training Brig.			
Boxer	Navy Yard, Portsmouth,	65	75
Torpedo Boats.			
Stringham	Harlan & Hollingsworth,	99	99
Goldsborough	Wolff & Zwicker,	99	99
Blakely	Geo. Lawley & Son,	99	99
Nicholson	Lewis Nixon,	99	99
O'Brien	Lewis Nixon,	98	98

It is reported that the minister at Ottawa will order a survey of Detroit river between Detroit and Lake Erie in order to determine the international boundary line. The last survey was made in 1822, and it is related that it is difficult, owing to physical changes, to determine where the line of demarcation between Canada and the United States really lies.

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PITTSBURG COAL CO.'S PROFIT SHARING PLAN.

As a rule profit sharing plans do not work out as well in practice as in theory but that of the Pittsburg Coal Co. of Pittsburg seems to be quite successful according to a statement just issued by Mr. J. B. L. Hornberger, president of the Pittsburg Coal Co.'s Employes Association. Under the plan the employes purchase preferred stock of a company through the Pittsburg Coal Co.'s Employes Association and pay for it at the rate of $1 per month per share. They have the privilege of withdrawing from their contracts at any time upon thirty days' notice and when withdrawals are made purchasers receive back the full amount of their payments plus interest at 5 per cent per annum. A new series of stock purchase contracts begin the first day of each month and so far forty-five series have been issued. The association purchases the company's preferred stock in the market from time to time and the dividends paid on the stock so purchased accrue to the individual purchasers, all expenses of the association being paid by the Pittsburg Coal Co. The earnings thus accumulated by the association during the first forty-five months of its operation up to July 31, 1904, aggregated $106,516.30. These earnings are divided pro rata among all purchasers who continue their monthly payments until contracts mature. The proportions of earnings accruing to the purchasers in the first, second and third series which have matured were sufficient to cut down the net cost to the purchasers to about $42 per share, and it is estimated that the cost of the stock to the purchasers of the next ten or twelve series of contracts will not materially exceed this amount. The contracts which have matured and on which delivery of stock has already been made covered 1,553 shares, leaving in force at this time 1,020 contracts covering 8,152 shares. The benefits are direct and substantial and both the employes and the company are well satisfied with the experiment.

FISHERIES CRUISER VIGILANT.

It is expected that the fisheries protected cruiser Vigilant just launched at the yard of the Polson Iron Works, Toronto, for the Dominion government will be swifter than any of the fishing tugs on the great lakes as she has been given engines of great power, designed for the purpose of overtaking any craft now engaged in the fishing business. The Vigilant is 176 ft. on the waterline, 22 ft. beam and 14 ft. 3 in. deep. Her engines are twin-screw, triple-expansion 13½, 22 and 36 in. cylinder diameters by 21 in. stroke. Steam is supplied from two Clyde boilers 11 ft. 6 in. in diameter by 12 ft. 8 in. long, allowed a working pressure of 200 lbs. Her armament will consist of four rapid-fire guns. The steamer has a flush main deck and bulkheads with a ram bow and elliptical stern of a design similar to the cruisers in the British navy. She has a commodious deck house aft of the foremast containing chart room and galley, and also a deck house abaft the main mast. The bridge extends from the forward deck house to the ship's side. The vessel is schooner rigged with jib, head, foresail and mainsail. She has a complete installation of auxiliary gear including steam steering gear, steam windlass for working the anchors, electric engines and dynamos and a powerful searchlight. Her cost complete will be about $150,000.

NEW FREIGHTER FOR W. H. BECKER.

Mr. W. H. Becker of Cleveland closed a contract with the American Ship Building Co. last week for a new steamer of 6,000 tons capacity to come out at the opening of navigation next year. She will be 400 ft. over all, 380 ft. keel, 50 ft. beam and 28 ft. deep. The engines of the steamer George W. Roby will be put in the new vessel. These engines have 19, 30 and 52-in. cylinder diameters by 40-in. stroke. Steam will be supplied by two Scotch boilers 12 ft. in diameter and 12 ft. long, allowing 175 lbs. pressure. The general arrangement of her hold will be similar to that of the Martin Mullen, having no beams or stanchions to interfere with the unloading machines. She will have twenty hatches.

FORE RIVER COMPANY REORGANIZED.

The Fore River Ship Building Co. of Quincy has been incorporated under Massachusetts laws to take over the property of the Fore River Ship & Engine Co. whose property was foreclosed last week. The capital stock of the concern is to be $4,800,000 to be divided into 24,000 shares each of common and 6 per cent non-cumulative preferred stock. At the foreclosure sale the property was bid in by Henry Endicott, Jr., of Boston, representing the reorganization committee for $1,000,000. It was announced that the outstanding indebtedness of the company was $1,600,000. The sale included all property of the company and contracts already made with the government and others. Mr. Francis T. Bowles, president of the company, has issued the following announcement concerning the sale:

"The Fore River Ship Building Co., a corporation organized under the laws of the Commonwealth of Massachusetts, has this day purchased at foreclosure sale the property of the Fore River Ship & Engine Co. covered by its mortgage to the Adams Trust Co. as trustee, and will carry on the business heretofore carried on by the Fore River Ship & Engine Co. The Fore River Ship Building Co. has had new cash amounting to $1,250,000 paid in, and will assume for its own account the contracts for material and supplies heretofore made with the Fore River Ship & Engine Co. Will you please render all future statements and make all future shipments under existing contracts to the Fore River Ship Building Co., which will settle all accounts which may become due."

TRAFFIC OF SUEZ CANAL.

Following is the report of the commerce of the Suez canal for the four weeks ending Aug. 12, 1904, showing the number of vessels coaled under the various flags and the amount of tonnage. It will be seen that as far as the American flag is concerned it is the same old story. The stars and stripes do not appear to exist as far as oversea trade is concerned.

	No. of Vessels.	Am't of Tonnage.
Austrian	6	20,325
British	196	574,930
Dutch	17	43,578
French	25	78,819
German	43	157,286
Italian	6	14,255
Norwegian	5	13,137
Russian	2	6,592
Spanish	2	5,883
Turkish	1	901
Total	303	915,766

The cruiser Milwaukee was launched on Saturday last at the yard of the Union Iron Works, San Francisco. The launch was successful in every way and will be described in detail in a later issue of the Review. The signal to launch the ship was given by Miss Lillian Jeffrey, daughter of Mr. Frank Jeffrey, the vice-president of the company, and the vessel was christened by Miss Janet Mitchell of Milwaukee, daughter of the late United States Senator John Mitchell. The Milwaukee is a protected cruiser 424 ft. long, 66 ft. beam with 22 ft. 6 in. draught. She is designed to realize 22 knots with 21,000 H. P. The cost of the Milwaukee's hull and machinery is $2,825,000.

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AUTUMN CUP RACES.

In the New York Yacht Club's race off Glen Cove last week for the Autumn cups all expectations were upset. Cornelius Vanderbilt's 70-footer Rainbow won in her class, and the Yankee was beaten fairly and squarely by the Virginia. In the 60-ft. class the Weetamoe was beaten by the Neola, and the 36-footer Mimosa III., for the first time in many races, beat the Spasm and Anoatok.

The race, hotly contested from start to finish, was sailed in a moderate breeze that held comparatively steady. The seventies carried clubtopsails and spinnakers, and balloon jibtopsails were set on two legs of the 21¼-mile triangular course. The Rainbow was admirably sailed by her skipper, Clayton Haff. Mr. Vanderbilt is at the army maneuvers in Virginia, and he was represented on board by Newbury D. Lawton and George A. Carmack. W. K. Vanderbilt, Jr., sailed the Virginia, and handled her much better than heretofore. The Yankee was sailed by her owner, J. Rogers Maxwell.

The start was at 12:25. The 36-footer Spasm had the lead, followed by the Mimosa and the Anoatok. The other two classes started at 12:30. The 60-footer Weetamoe was first to cross the line, followed by the Yankee, the Rainbow, the Virginia, and the Neola. The course was to a mark off Parsonage Point, thence to another off Shippan Point, and back to the starting line. The first leg was a broad reach. The next leg was another broad reach. The Rainbow gained on this leg by steering a better course. The Yankee and Virginia were so close together that they got into a luffing match and steered to southward of their course. The Virginia, however, secured the lead.

The Virginia not only held her own with the Yankee on the windward work, but also gained. The Rainbow had the race well in hand at the first crossing of tacks, and she never lost any of her advantage. She finished an easy winner, with Virginia second.

The Neola and Weetamoe, astern, meanwhile were making a gallant struggle. The Weetamoe gained somewhat between the second mark and the finish, but not enough to win the race. The Neola won by more than a minute.

The 36-footers had more of a race than was laid out for them. They overlooked the second mark and went to Centre Island, about four miles further eastward, so they actually sailed 18 miles instead of 12 miles. Following is the summary:

SLOOPS—CLASS H.

Boat and owner.	Start.	Finish.	Elapsed time.
Yankee, J. Rogers Maxwell	12:30:26	3:23:24	2:52:58
Rainbow, Cornelius Vanderbilt	12:30:37	3:19:53	2:48:16
Virginia, W. K. Vanderbilt, Jr.	12:31:18	3:21:51	2:50:33

SLOOPS—CLASS I.

Weetamoe, H. F. Lippitt	12:30:15	3:36:22	3:06:07
Neola, Geo. M. Pynchon	12:32:00	3:37:06	3:05:06

SLOOPS—CLASS M.

Spasm, E. B. King	12:25:18	3:13:42	2:48:24
Mimosa, T. L. Park	12:26:47	3:14:45	2:47:58
Anoatok, W. G. Brokaw	12:27:00	Did not finish.	

ITEMS OF GENERAL INTEREST.

It is announced from Berlin that the German admiralty has ordered two tank steamers to be built at Kiel.

The Fore River ship yard announces that the battleship New Jersey will be launched some time in November.

The Boston Tow Boat Co., Boston, Mass., has the contract for removing the wreck of the steamer Kiowa from Boston harbor at $8,000.

The four-masted schooner Augustus H. Babcock was launched last week from the yard of E. & I. K. Stetson, Bangor, Me. She is 216 ft. long, 41 ft. beam and 19 ft. deep.

The steamer Wyoming is at the ship yard of Abram Smith & Son, Algonac, Mich., for repairs necessitated by the fire at Midland where she was aground. It will take about three weeks to finish the repairs upon the vessel.

It is reported that the Japanese government has given a contract to the Carnegie Steel Co. for 7,500 of the finest grade nickle steel plates. It is reported that Japan will begin the building of two first-class battleships this fall.

Major G. S. Bingham, Army building, Whitehall street, New York., will receive proposals until Sept. 16 for the construction of a single twin-screw steamer for harbor service in the quartermaster's department at New York.

The North German Lloyd steamer Kaiser Wilhelm II recently made the westward passage in 5 days, 12 hours and 44 minutes, her day's runs being 419, 551, 570, 577 583 and 347, a total distance of 3,053 miles at an average speed of 23 knots.

The Sub-Surface Torpedo Boat Co. with offices at 152 Market street, Paterson, N. J., filed a certificate of amendment of charter last week increasing its capital stock to $1,250,000. C. R. Agnew is the vice-president of the company and E. H. Blank is secretary.

It is reported in naval circles in Britain that the admiralty has decided to abolish the 4.7-in. and 6-in. guns in the navy and to substitute for them the 9-in. gun. Exhaustive experiments have recently been made with this weapon and results of the trials have, it is said, given the greatest satisfaction to the admiralty.

The new battleship Ohio built at the Union Iron Works, San Francisco, has been delivered to Capt. L. C. Logan as the representative of the government preliminary to being placed in commission. Capt. Logan will command the Ohio when she engages in actual sea service. She is to be assigned to the Asiatic station.

Advices from England are to the effect that the keels for the two Cunarders building for the Cunard Steamship Co. have been laid—one in the yard of John Brown & Co., Ltd., Clydebank, Scotland, and the other in the yard of Swan, Hunter & Wigham Richardson at Wallsend-on-Tyne, England. Undoubtedly the greatest rivalry will exist between these two great ship building firms as to which will put their vessels into the water first.

The four-masted schooner Margaret Thomas was launched from the yard of Washburn Bros., Thomaston, Me., last week. The schooner is 192 ft. long, 40 ft. beam and 19 ft. 6 in. deep. The vessel has three full decks and full sets of hanging knees which give added solidity. The frame is of Virginia oak, the planking is yellow pine 4½ in. thick and the ceiling is the same material 10 in. thick. The company will begin work upon a new three-masted schooner at once.

Apparently nothing exceeds the deliberation with which the government pays out money. The prize money for officers and crews engaged in the battle of Manila on May 1, 1898, is now being paid out by the treasury department. Among the checks so far sent out are those of Admiral Dewey, Capt. Lamberton and Mrs. Harriet Gridley, the widow of Capt. Gridley. The check to Admiral Dewey is for $18,560. The next largest sum goes to Mrs. Gridley whose husband was the commander of the Olympia. This is for $9,413. Capt. Dyer, who commanded the Baltimore, receives $8,011. The amount to Capt. Wilde, commander of the Boston, receives $5,317. Capt. Coghlan, commander of the Raleigh, receives $5,854. Capt. Asa Walker who commanded the Concord receives $3,834. The amount to Capt. Wood who commanded the Petrel was $2,849 and Capt. Daniel B. Hogdson of the McCullough receives $1,754. Capt. Lamberton as fleet captain receives $5,059. The total sum to be divided is $370,336.

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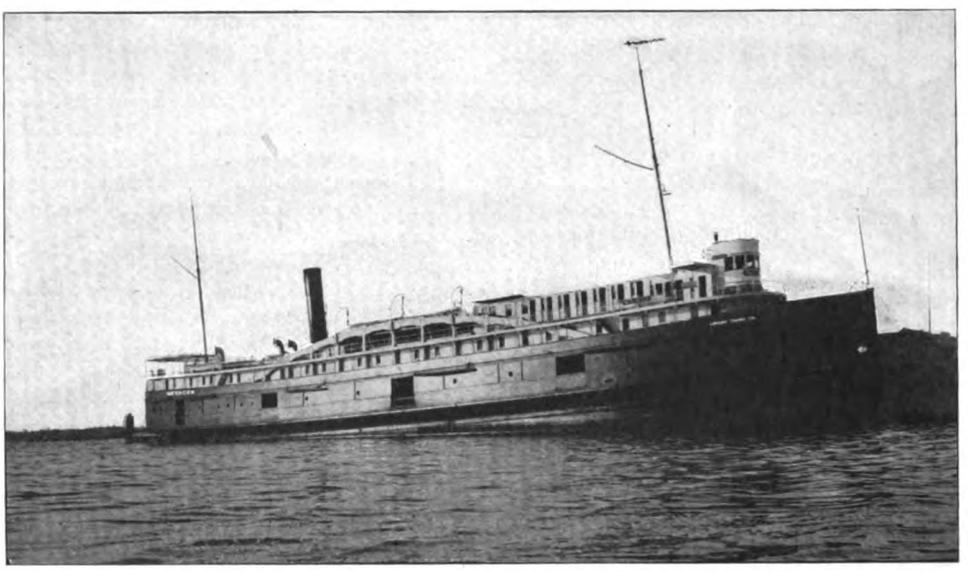
REBUILD OF THE STEAMER NYACK.

The steamer Nyack, belonging to the Crosby Transportation Co., was rebuilt under the direction of Mr. C. F. Glew, the superintendent of the company, and is now practically a new steamer. The hull work in her rebuild consisted of the main keelson being removed and replaced and a steel keelson plate 7/8 in. by 14 in. by 150 ft. being placed on each side of the keelson and thoroughly bolted every 21 inches. This has proven a great benefit to her, making her extraordinarily stiff. Part of the floor keelsons were replaced with new ones and her hold floors were taken up and replaced. Her coal bunkers were entirely rebuilt. She was given a new pilot house, bridge and Texas which contains twenty state rooms and forty-four berths, besides the crew's quarters. Her boiler is of the steam chimney type and originally had a water bottom. This water bottom was removed and legs substituted for it and each of the furnaces received new side sheets and the smoke box was entirely rebuilt. New staybolts were put into the boiler throughout and a new smoke stack was furnished. The engines were taken down and entirely refitted and two new crank pins put in. She was also fitted with a Dake steam steerer. The Nyack in company with the Naomi is operated between Milwaukee, Grand Haven and Muskegon. The Nyack's reputation as a fine seagoing steamer is one of the best on the lakes, and considering her tonnage she is one of the most economical boats on fresh water, consuming about 1,200 lbs. of coal per hour.



THE NYACK AS SHE LOOKS TODAY.

GRAIN SITUATION AT DULUTH.

Duluth, Sept. 13.—The first cargo of new wheat going out of Duluth this fall was loaded from the Superior Terminal elevator by Spencer, Moore & Co. on the steamer Duluth of the Western Transit Co. This wheat, as well as all loaded of late, was at the going rate of 1 cent a bushel. There are more boats than ships and no especial demand for room.

The steamer Jas. H. Reed of the Providence Line has been in dry dock at Superior for some time and has now come out and is in commission. The ship was damaged on Colchester reef, Lake Erie, and her repair bill was about $35,000. This dock has been fairly active this summer, employing about 200 men in repairs on steel ships, but is doing little else.

Wheat is commencing to come in considerable quantity, and on Monday morning there were more than 200 cars of grain on tracks awaiting unloading. So far more coarse grains than anything have arrived, barely being in especially good demand.

A good share of receipts of wheat at Duluth for the past week or two have been 300,000 bus. sold by shippers here for Buffalo and eastern mills, and that had to be delivered at once. This was all good wheat that was drawn from Minneapolis territory and shipped through that city to Duluth. There has been good demand for wheat for eastern mills but so far there has been little with which to fill this demand. Farmers are selling less wheat to arrive than for many years and are evidently waiting what they consider a good opportunity before they dispose of their crop.

Much wheat has been coming in here of late that would not weigh over 45 to 47 lbs. to the measured bushel. Of course this is sold by weight, but it cuts down the yield in bushels tremendously. The lean, dirty, low grade stuff that the inspection department is running up against, the inspectors are not docking for dirt, but leaving the dockage to be settled by buyer and seller on sample.

A telegram was received by a leading Duluth house from its agent in Winnipeg, a few days ago, in which the statement was made that fully one-third of the Canadian northwest late crop would be No. 3 or lower, on account of damage from wet weather, rust and frost. Since then there have been frosts that would have ruined all wheat standing and not beyond the state where it could be injured.

Local exporters have been working Manitoba wheat for Europe right along of late on a basis of 10 cents a bushel less than Duluth wheat is selling for. They are, of course, unable to sell any American wheat abroad and they figure there will be little or none to be spared from this side.

STEAMER HADDINGTON'S MAIDEN TRIP.

The steamer Haddington, built by the Bertram Engine Works Co. of Toronto, put into Cleveland on her maiden trip light from Toronto Wednesday. She left the ship yard at 5 p. m. Friday and would have taken a cargo of rails from Buffalo on her maiden voyage had there not been some hitch in the terms for loading the steamer. The trip through the Welland canal was made mainly at night and she handled so beautifully in the locks that an egg hung over the bow was carried through unbroken. The Haddington is fully Canadian canal size, being 256 ft. over all, 42 ft. beam, 14 ft. 6 in. deep and having a draught fully laden of 14 ft. She logged 10½ miles an hour across Lake Erie at 120 lbs. of steam. Her engines are triple expansion, 15, 25 and 42 in. cylinder diameters by 30 in. stroke, supplied with steam from two Scotch boilers 10 ft. by 11 ft. The general arrangement of her engine room reflects great credit upon Mr. J. J. Weinert, the mechanical engineer of the Bertram Engine Works Co. Everything is compact and right at hand, with an almost total absence of piping. Her equipment is modern throughout with a dynamo for the electric lighting outfit, steam windlass, steam steerer, anchor windlass, and a complete system of pumps. The ballast pump may be used as an independent air pump. The temperature of water in the feed water heater is from 180 to 190. The steamer is equipped with six deck winches, which are so placed that they may be used two to each hatch and derive their power from the main boilers.

The Haddington is a typical tramp, a type somewhat infre-

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quent on the lakes, but for which it would seem as though considerable business would exist. She is equipped for any service whatever and can handle either grain, ore, coal or package freight. She is, of course, primarily designed as a package freighter.

From the human or livable standpoint no one has any cause to quarrel with this steamer. Her accommodations for officers and crew are really sumptuous. The owner's quarters are finished in antique oak, while the prevailing decoration of the suite of rooms is yellow. The captain's quarters are finished in oak with all modern conveniences. The dining room is also in oak, but the prevailing tone of the decoration is red, giving the effect of warmth and cheerfulness. The crew's quarters are also abundantly airy, are well furnished and have also the great convenience of running water. The general design of the steamer is a tribute to the ability of Mr. J. Gerald, manager of the Bertram Engine Works Co. Capt. J. Delaney, master of the vessel, is one of the very few men who are licensed to pilot a steamer from Duluth to Montreal. He is a St. Lawrence river pilot and is delighted with the new craft. The other officers of the Haddington are: J. Rae, chief engineer; A. Fisher, second engineer; John McGowan, first mate, and George Motley, second mate. The Haddington loaded 2,000 tons of coal at the Ellsworth dock for Sault Ste. Marie, Ont., which is her maiden cargo. She is certainly a type of vessel that ought to be extremely serviceable. The Haddington is under the management of J. T. Matthews, Board of Trade building, Toronto.

LAKE FREIGHT SITUATION.

The hopeful feature of lake trade during the past few days has been the improvement in the grain trade. Grain is moving more freely and rates have advanced so that vessels have left Lake Erie ports light for Chicago in order to carry it. This in turn has had its effect upon the general market and the tone of trade is much better, though no prospect exists of an advance in rates on ore and coal at present. The coal trade is in a wretched condition, owing to the state of the docks at the head of the lakes. Some of the docks are unable to handle another cargo and shippers have been instructed to let up on shipments. Ore is moving very heavily, but it will be practically impossible from now on to make the aggregate of shipments for the year more than 17,000,000 tons. This amount is not commensurate with the capacity of the furnaces of the country, and it is quite probable that both docks and furnaces will be bare at the opening of navigation next year. This condition, therefore, tends to an early opening of navigation and a heavy movement of freight during the year. Vesselmen expect to in a measure recoup their fortunes next year, as at prevailing rates there is practically no profit whatever for the small boat and only a modest return upon the investment for the modern carrier.

SITUATION AT HEAD OF THE LAKES.

Duluth, Sept. 13.—There is quite serious detention of ships in the coal trade, and they are lying about Duluth harbor, often in blocks of half a dozen at a time. Docks have been unable to take care of the arrivals. Work has begun on the extension of the docks of the Boston Coal Dock & Storage Co., which is more than double the dock's capacity.

Iron ore shipments are heavy, and the indications are for a better fall business than was expected. There is a distinct improvement in the iron trade. It seems to be the policy of eastern ore men and agents to conceal the fact that sales are being made at improved prices, and the fact that Mesabi bessemers have been sold as high as $3.25 a ton within a few days has been studiously hidden. It is a fact, nevertheless. This is 35 to 40 cents better than the prices of two months ago.

The Duluth offices of the Steel Corporation are figuring on a strippling proposition that will exceed in importance any that has been undertaken, and will open the largest mine in the world. No announcement has been made and no bids called for the work, which may be done by the company direct.

CHICAGO GRAIN REPORT.

Chicago, Sept. 13.—Receipts of the past week were something upward of 1,000,000 bu. wheat, about 5,000,000 bu. corn and 2,000,000 bu. oats, with out-movement, as detailed below, aggregating 4,500,000 bu.

At the outset of the present week the freight market apparently yielded to the influence of this consistent grain movement and vessels are in good request on the basis of 1¼ cent wheat and corn to Lake Erie ports, the Georgian Bay and Port Huron demand following along the Buffalo figures with active inquiry for Montreal delivery at nominally 3¼ cent corn. Reasonable shipping activity from surrounding down cargo ports will assure continuance of the improved tendency in this quarter.

The September announcement by the statisticians of the United States department of agriculture suggest a total winter and spring wheat crop of 523,000,000 bu., of corn 2,327,000,000 bu. and of oats 787,000,000 bu. The figures confirm the damage estimates in wheat to the extent of about 100,000,000 bu. under last year's crop, and perhaps substantiates the claim for small exportable surplus from this country. However, since the present wheat prices reflect the restricted supply, it is to be hoped that returns in outlook of corn and oats will compensate suitably toward the coming general lake movement.

In the summary of weekly shipments noted below, distribution is about as follows: Via all rail lines of wheat 140,000 bu., of corn 210,000 bu. and oats 270,000 bu; via lake to Buffalo of wheat 145,000 bu., corn 2,000,000 bu. and oats 250,000 bu.; and via lake routing for Canada points 1,000,000 bu. corn and 90,000 bu. oats.

Lake and rail shipments—

	This week.	Last week.	Same week last year.
Wheat	309,165	323,514	471,865
Corn	3,388,012	2,172,806	2,038,014
Oats	620,654	912,050	1,850,708
	4,317,831	3,408,370	4,360,587

	Shipments since Jan. 1, 1904.	Same time last year.
Wheat	10,029,278	13,759,332
Corn	49,587,452	58,372,276
Oats	32,371,614	46,540,939
	91,988,344	118,672,547

Stocks of grain in elevators—

	This week.	Last week.	Same week last year.
Wheat	4,082,000	3,680,000	6,215,000
Corn	4,286,000	3,773,000	5,002,000
Oats	9,116,000	7,304,000	3,888,000
Rye	675,000	641,000	435,000
	18,159,000	15,398,000	15,540,000

The steamer Clyde, owned by the Tonawanda Iron & Steel Co. put into Detroit last week with a disabled engine and went to dry dock for repairs. When but a few miles out of Buffalo the lock shaft of the engine broke and serious results were only prevented by the prompt shutting off of steam by J. P. Merrill, the chief engineer, who happened at the moment to have his hand on the throttle. After a short delay the low-pressure cylinder was disconnected and the Clyde made the trip to Detroit losing only the high-pressure cylinder.

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MR. FRANK WATERHOUSE'S ADDRESS.

One of the most capable addresses with which the Merchant Marine Commission was favored during its tour of the country was that delivered before it by Mr. Frank Waterhouse, agent for the Boston Steamship Co., at Seattle, Wash. Mr. Waterhouse's exhaustive statement was accompanied by most comprehensive tables of the subsidies paid to shipping by other nations which the Review regrets greatly that it has not space for at present. However the salient features are touched upon in the address itself. Mr. Waterhouse's paper was as follows:

MR. FRANK WATERHOUSE.

I wish briefly to present to you a few facts regarding the present condition of the American ship builder and the American ship owner and to briefly point out the very unfavorable position in which the American ship owner is placed in the foreign carrying trade, and the enormous handicap which the American ship builder has to face in consequence. As managing agent, I represent a new line of American steamers, which operate from Puget Sound to Japan, China, Siberia, and the Philippine Islands, and I am also personally interested in the ownership of American vessels, which should be engaged in the foreign carrying trade, if conditions permitted, and I am also interested in the ship building industry on Puget Sound.

The present condition of the American ship builder and the American ship owner, as regards the foreign trade of the world, is practically the same, inasmuch as they are both unable to compete successfully with foreign ship builders and foreign ship owners, and the remedy needed for the one, should be the remedy that would relieve the condition of the other, also.

1. The condition of the ship building industry in the United States seems to have reached a crisis, and about the only hopeful thing that can be said about it is that it cannot well get worse. Taking the whole country over, there is not a single merchant vessel of any importance, that has been laid down during the last year. For more than two years, I believe, no order has been given for a single ship, for the foreign trade of the United States. Practically all of the new construction that has been done recently by the ship yards of this country, has been government, coastwise and lake vessels.

2. The prosperity and advancement of our ship building industry are dependent upon two things:

First. Demand for ships.

Second. Competition on an equal footing, with foreign building.

The work done in building for coastwise and lake commerce, cannot be regarded as a reasonable gauge or limit of the possibilities of the ship building industry in this country. In order that it may develop and prosper, it must have the full field before it, with the opportunity not only to build American ships for competition with foreign built ships, but to build ships in competition with foreign builders. The ability, advantages and inclination are not wanting in this country, necessary to vie with and even to eclipse European nations in ship building, but the opportunity has not yet come, and in the present state of American commerce, it never will. Conditions are undoubtedly growing steadily worse, in regard to demand for American ships, for three reasons:

First. Greater first cost, as compared with foreign ships, entailing a greater amount of invested capital.

Second. Greater fixed charges and operating expenses, as compared with foreign ships.

Third. The powerful and growing effect of foreign subsidies.

So serious have these disadvantages become, and so great is the handicap thus loaded upon American ship owners, that in the words of the president of one of the largest American steamship companies, "The point will soon be reached when American ships engaged in foreign trade, will either be compelled to go out of commission, or be transferred to foreign flags."

The cost of American built ships is from 25 per cent to 60 per cent greater than that of English-built ships. This is partly due to the high wages paid by us, and partly to the protective tariff upon ship building materials. But I am informed that even these disadvantages could be overcome, if there was work enough to keep American ship yards continuously busy, for a sufficient length of time to enable them to develop methods and systems to bring the ship building business to one of manufacturing and to reduce the percentage of fixed expenses. This has been done in other lines of industry, the examples of which are well known. American engines and bridges are built in successful competition with foreign work, by sheer force of system, introduction of piece work and specializing as regards both plant and labor.

Under present conditions, and as long as the cost of production is so much greater in the United States, than it is in Europe, and in Japan, there is no hope of competing on an equal footing, with the latter; but if by any means, a stimulus can be given to American shipping, which will permit of its competing on anywhere near an equal basis with foreign vessels, and creating a demand for ships from American owners, the development of the ship building industry will be such, that by the time the commerce of our own country is carried in our own ships, our ship yards will be in a position to reach out for foreign work. During recent years, the work in our ship yards has been extremely spasmodic, and the development of the ship building industry in this country has been greatly hampered because of the constantly decreasing demand for American vessels.

3. These statistics of work done by American ship yards, and of the work on hand and in progress at the present time, demonstrates the necessity of aid from the general govern-

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ment, which aid, it seems to me, must take the form of legislation in the following directions:

First. Protection to the products of American ship yards.

Second. The creation of a demand for American ships by removing the handicap under which they are at present operated, and placing them on a fairly equal footing with foreign vessels in the carrying trade of the world.

The case is urgent; the present condition is deplorable, and affects not only the ship building industry and the ship owning industry, but the welfare of the entire nation. Our merchant marine is practically gone; we have need of 20 per cent of the world's steam tonnage to handle our foreign commerce, and we have ships to handle less than 9 per cent of it. We had 108,000 tons more registered tonnage before the civil war, than we have now; and instead of our merchant fleet doing the bulk of the carrying business of the world, our own commerce is practically in the hands of foreign ships. Last year we paid out $100,000,000 in carrying charges to foreign ships, a large part of which at least, ought to have been paid to American ships, if such had been in existence. We are building up a great navy, largely for the protection of American commerce, but by the time it is completed, at the present rate of decline in American shipping, there will be no American ships to protect.

We are going to build the Panama canal, but by the time it is completed, we will have no merchant marine engaged in foreign trade, to receive its benefits. Our merchant ships have been and are being "run out of business" by the extra cost of operating and through the subsidies received by their competitors. This condition is appalling and it surely warrants decisive and adequate action on the part of our government, for its recovery. In my opinion, the promptest, surest and most effective remedy that could be applied to relieve the condition of ship builders and ship owners and to secure to our merchant marine a fair share of the foreign carrying trade of our country and of other countries, is for our government to adopt the policy of subsidy payments to American-built and American-owned vessels. Such subsidy payments, in order to be effective, should be liberal,—sufficiently large to relieve the present condition and should be paid for the carriage of mails and in the form of military and naval subventions, in consideration of which American vessels should be built to the requirements and specifications of the military and naval establishments of the United States, so that they could be available, could be used and should be subject to call by the United States in the event of war, for use as auxiliary cruisers and army transports. All other maritime nations seem to find the policy of subsidy payments, necessary. England has always recognized the necessity of fostering her merchant marine and of striving for supremacy on the sea, in business, as well as in war, and she does not hesitate to adopt any means to secure that end. Consider the latest subsidy contract between the British government and the Cunard Line, by which the former agrees to loan $13,000,000 at 2¾ per cent interest, to build what are to be the two finest and fastest ships in the world, and which the British government agrees to subsidize to the extent of $350,000 per year for each vessel.

The three Canadian Pacific steamers which operate from British Columbia to the Orient, and with which our own steamers compete receive subsidies amounting to £15,000 a year from the Canadian government and £60,000 a year from the British government. French vessels are heavily subsidized. Japan subsidizes her ships as high as $650,000 a year for one line. Germany is a protected country, but the last few years have witnessed a tremendous impetus to her shipping and ship building. This has been due partly to the general expansion of German trade, but it has been backed up and balanced by subsidies and by remission of duties upon ship building materials, to which the German government was forced to come, by the same conditions that now confront the United States, and it has been successful to a surprising degree. It is out of the question to suppose that American ships can enter such a field as this, or that capital will be invested in American ships, without equal advantages.

Subsidies to American ships may not be logical and consistent with our general policies; but such is the nature of the competition with which we have to contend, and such is the condition of our ship builders and ship owners at the present time, that the adoption of some form of adequate subsidy payments seems to me to be absolutely necessary, and that nothing else will succeed with the same certainty and promptness. Aside from this, there is no time to experiment or argue over the matter; the case demands relief which will be prompt, specific and sure, and in my opinion, money spent by the general government in the payment of naval and military subsidies and for the carriage of mails, will be returned with compound interest to all classes of producers in this country, not only by holding the commerce which we already have, but in opening up new channels of trade.

The transpacific lines of which I am manager, are operating their American steamers, which are all A-1, new, model in every respect, in competition with the Nippon Yusen Kaisha Japanese Line, with the Canadian Pacific Railway's Express Line, with the China Mutual Steam Navigation Co., and with the Ocean Steamship Co., which are British lines. The Nippon Yusen Kaisha steamers were built in Japan and in Great Britain and the steamers of the Canadian Pacific Railway, the China Mutual Co. and of the Ocean Steamship Co., were built in Great Britain. The average cost of the above vessels was at least 40 per cent less than if they had been built in the United States; in addition to this, their regulations permit them to carry fewer of a crew, whose wages are at least 25 per cent less than we have to pay on American steamers. Besides these advantages, the Nippon Yusen Kaisha's Puget Sound line receives an annual subsidy from Japan of £134,052 and the Canadian Pacific line receives an annual subsidy from the Canadian government of £15,000, from Great Britain for carrying mail, £60,000 and from the British admiralty, for the privilege of calling on their vessels for use in time of war, £7,313.

The following is an approximte comparison of the fixed charges of either of our American steamers Shawmut or Tremont, which we are operating in our line from Puget Sound to the Orient, and the fixed charges of either of the British steamers Keemun, Ningchow or Oanfa, which are run in competition with our vessels, to the same ports and are of almost exactly the same tonnage, same carrying capacity and have the same earning power:

Fixed Charges per Day:	Shawmut or Tremont.	Keemun, Ningchow or Oanfa.
Corporation expenses and taxes	$ 19.00	$ 8.79
Insurance	100.58	65.75
Interest	136.99	82.20
Depreciation	136.99	82.20
Total	$402.56	$238.94
Difference in favor of British vessels, per day		$163.62

Under these conditions, it is almost impossible to operate American vessels profitably, particularly in the trans-Pacific trade, which is spasmodic, six months of the year cargo being abundant, and the remaining six months, but very little cargo moving. During the dull period, our principal competitors have their subsidies to maintain them, while we have to operate our American vessels at a very loss.

The steamers of all regular lines engaged in the transpacific trade between the United States and the Orient, employ Chinese as sailors, firemen and steward's assistants. The experience of the steamship companies, as regards earnings and expenses since their lines were established, will prove

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the absolute necessity of the employment of Chinese in the above mentioned capacities. The earnings will not permit any increase in operating expenses. The ordinary pay of a Chinese sailor and fireman is $7.00 gold, per month; of an American fireman, $45.00 gold per month: Of a Chinese steward's assistant, $5.00 gold per month; of an American steward's assistant, $25.00 gold, per month. The only way that I know of, by which American owners can afford to consent to the employment of American sailors and firemen on steamers engaged in the transpacific trade, will be for the United States government to make up for the loss incurred by the steamship owners, by doing so.

The difference in the wages paid to the crew of an American ship and of a British ship, for exactly the same number, and for exactly the same ship, is seen in the following example of a vessel which was transferred from the British to the American flag:

	American.	British.	
Captain	$125.00	$100.50	
1st Officer	75.00	47.50	
2nd Officer	60.00	35.00	
Chief Engineer	125.00	90.00	
1st Assistant Engineer	70.00	60.00	
2nd Assistant Engineer	60.00	35.00	
2 Oilers	80.00	50.00	
Steward	40.00	30.00	
Cook	35.00	26.50	
8 Sailors	200.00	120.00	6 sailors
6 Firemen	210.00	129.00	
2 Coal Passers	60.00	43.00	
	$1,140.00	$766.00	

Per month year difference.....$4,536.00

The crew under the American flag was greater in numbers by two men, than under the British flag.

In round numbers, the world's steam tonnage amounts to 25,000,000 tons, four-fifths of which is used on salt water; one-half of this tonnage is handled by Great Britain, while the United States comes in with but 3,374,245: 2,846,835 tons of this is engaged in coastwise and lake trade, which of course is already amply protected, and 527,410 in foreign trade, and only eight companies of any importance, owning over 10,000 tons each, engage their vessels in the foreign trade, or even in the trade of the Philippines, Hawaii or Porto Rico.

The Hamburg-American Line alone earns a yearly average of $13,000,000, passenger and freight receipts from the foreign trade of the United States.

The steamship requirements of our foreign trade with the several grand divisions of the world are approximately.

Europe	700	steamers	3,200,000	tons gross
North America	250	"	400,000	" "
Asia-Australia	100	"	400,000	" "
Africa	80	"	380,000	" "
South America	110	"	300,000	" "
Tank Steamers	70	"	250,000	" "
	1,335		4,930,000	

At present only 8 per cent of these requirements are being handled by American steamers. To do our own business, we need 20 per cent of the world's steam tonnage employed in foreign and colonial trade.

The registered tonnage of the merchant fleets of the several maritime nations of the world are as follows:

United States	889,000 tons.
Italy	1,180,000 "
France	1,480,000 "
Norway	1,660,000 "
Germany	2,960,000 "
British Empire	14,800,000 "

The United States has developed the most marvelous foreign commerce of all the nations of the world. We are sending into other lands, nearly $5,000,000 worth of American products and commodities, every day; but it is a significant fact that American ships convey less than 9 per cent of our exports and imports. The tribute paid to foreign ships, for conveying merchandise to and from the United States, last year, amounted to over $100,000,000.

Our government could greatly relieve the condition of the regular transpacific American lines by turning over to them the carriage of all government passengers and supplies, to and from the Philippine islands. It has cost the United States to maintain and operate its transports, during the past six years, over $20,000,000. These figures do not include the original cost of the transports, or the initial cost of changing them into transports, when they were first purchased. When the transport service was first established on the Pacific, it was undoubtedly a necessity, and indirectly, on account of the service it has performed, I believe it has repaid the country for the money invested in it. When the transports were purchased, there were no American commercial steamers available on the Pacific ocean, on which the government could depend to move its troops and supplies, to and from the Philippine islands. This condition, however, has entirely changed during the last two years, and there is now, plenty of American steam tonnage on the Pacific, available for this work and anxious to undertake it. There are at least eight magnificent new American steamers, which are available for this service, the smallest of which has a passenger capacity of over 600 and a cargo capacity of over 14,000 tons, and the largest, a passenger capacity of about 2,000 and a cargo capacity of 28,000 tons. These eight are all twin screw vessels, most of which are much faster than the present transports: All are new, thoroughly modern, and some of them have been fitted up expressly for the purpose of carrying troops, according to the requirements of the United States military authorities. If the present transports could be laid up out of commission, and be there retained by the government in case of need, and if the government business could be fairly divided between the regular American lines operating from Pacific Coast ports, the arrangement would, I am confident, prove to be an economical one for the government, as the service would be undertaken by the commercial lines, for less than it is now costing by the use of army transports, and the American commercial lines would be greatly benefited and their present condition much relieved, as a result.

Great Britain formerly maintained a huge transport service, but she has latterly abandoned it entirely, for economical reasons, and because she found that her merchant steamers could handle her transport service more cheaply and more satisfactorily, than she could maintain regular army transports for that purpose, and because she realized that her merchant steamers needed the business, in order to assist in maintaining them in the regular lines that Great Britain has in operation to all her foreign possessions and, in fact, to all parts of the world. Our government has abanodned its transport service on the Atlantic. It ought to do the same on the Pacific.

Among the finest pleasure craft on the Mississippi is the side-wheel steamer Valeria built for Capt. J. D. Lamb of the Lamb Boat & Engine Works, Clinton, Iowa. The Valeria is 125 ft. long, 25 ft. beam and 4½ ft. deep. Her engines were supplied by the Clinton Novelty Iron Works, Clinton, Iowa. They are 12 in. cylinders by 6½ ft. stroke of the poppet valve lever pattern with California cut-off. She is equipped with a firebox boiler supplied by the Star Boiler Works of Clinton, Iowa. The cabin contains seven staterooms with bath in each. The dining room is furnished in dull green and is very beautiful.

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AROUND THE GREAT LAKES.

The strike of ship carpenters at the plant of the Buffalo Dry Dock Co., Buffalo, N. Y., was declared off this week and work resumed.

The new car ferry building at the yard of the Great Lakes Engineering Works, Detroit, for the Michigan Central railway will be named Detroit.

It is announced from Montreal that the first cargo of steel rails to be manufactured at Sault Ste. Marie arrived there this week on the steamer Neepewah.

The dredge Port Huron was sunk in the rapids above Port Huron nearly two months ago, and was raised last week. There is 3 ft. of sand in the hold of the dredge.

The wrecking steamer Manistique will begin work upon raising the Rutland Line steamer Walter L. Frost, which was wrecked last winter on South Manitou island.

Louis Pfohl & Son of Buffalo have abandoned the task of raising the hull of the burned car ferry Shenango at Conneaut. It is now up to the government to dispose of the wreck.

Richard Cuson, who manages the David Whitney boats, has gone to Buffalo to look after the Nipigon, which smashed a bridge near that port. It is said that the accident will cost the owners $3,000.

The United States engineer's office at Detroit has given the Michigan Central railway until May of next year to remove the old bridge between Grosse island, Stony island and the lower Detroit river.

The steamer Choctaw, belonging to the fleet of the Cleveland Cliffs Iron Co., which was ashore on Manitou island, Lake Superior, last week, has arrived safely at Cleveland. Considerable part of her cargo had to be lightered.

The steamer Kirby, ore laden, went on the rocks on the Canadian shoal off Windmill Point while trying to make the harbor of Buffalo last week. After lightering a portion of her cargo she was put off and taken to the plant of the Buffalo Dry Dock Co. for repairs.

The Lewis Sands Lumber Co. of Manistee, Mich., has leased the yard on Tonawanda island recently vacated by the W. W. Tyler Lumber Co. and will conduct a general business in hardwood lumber. It is announced that the company will next spring handle hemlock and white pine lumber also.

The steamer John Ericsson of the Pittsburg Steamship Co.'s fleet which went ashore near Madison, Lake Erie, last week, was released by the steamer Maritana after the lighter Rescue of the Great Lakes Towing Co. had taken 600 tons of ore from her. The Ericsson then went to Conneaut to unload.

The steamer Petoskey of the Dunkley-Williams Line, which has been running between Chicago and South Haven, has been secured to make trips between Milwaukee and Grand Haven for two weeks, taking the place of the steamer Naomi of the Crosby Transportation Co. The Naomi will go into the repair dock for an overhauling, and will be ready for service again about Sept. 20.

The United States lake survey steamer General Williams towed into Amherstburg last week a mass of wreckage which had been an obstruction to navigation in Lake Erie for some time past. It consisted of spars and rigging supposed to be from the old schooner Franz Seigel which went down off Monroe a year ago. It was found six miles from Middle Sister island direct on the Detroit river and south passage course.

Through the disabling of the steering gear of the Steel Corporation steamer John W. Gates the bow of the steamer struck the east bank of the cut opposite Mullen's coal dock off Amherstburg last week and the steamer swung to the west striking the dredge Tipperary and carrying away the anchor spuds and houses of the latter. The dredge was put out of commission for a few days, but the steamer was uninjured.

Work is progressing quite satisfactorily upon the new ship canal at St. Clair flats. Dredging has already been begun, one of the largest hydraulic dredges on the lakes being employed. The mud and sand is being carried by hydraulic pressure a distance of 3,500 ft. and already an island of 400 ft. square has been formed by material moved. Mr. J. E. Rabbitt of M. Rabbitt & Sons Co. of Toledo, which is doing the work, says that the most difficult part of the work is the placing of tie rods across the west pier which is now complete. The rods are for the purpose of strengthening the 50 ft. additional to the pier.

With the removal of the machinery from the hull of the old tug Merchant at Duluth last week one of the historical vessels of the great lakes has passed away. The Merchant was built in the late '50's and plied between Muskegon and Grand Haven on Lake Michigan. She was used for the carriage of mail and troops during the civil war. In 1881 she was transferred to Lincoln lake, a small body of water 12 to 15 ft. higher than Lake Michigan and about 1,500 ft. She was taken to Duluth in 1884 and was engaged in the fishing business for some time. Finally, however, becoming decrepit she was beached and has been used as a diving stand by small boys for some years.

Commissioner Davidson of the United States district court at Detroit issued warrants last week for the arrest of Capt. George W. McCullagh of the Tomlinson steamer Sultana and Capt. Steven R. Jones of the Western liner Buffalo. The complaints were sworn to by Lieut. Col. Davis, United States engineer in charge of the district, who accuses the men of violating the regulations governing the St. Clair flats ship canal. The Sultana is accused of overtaking and passing the tug Cadillac and her tow in the dredge channel between the lower end of the canal and the gas buoys. The Buffalo is charged with drawing up and passing the steamer James B. Eads of the Pittsburg Steamship Co.'s fleet within the limits of the canal on the morning of Aug. 1. Capt. Jones in his statement of the case says that he blew one whistle as a signal that he intended to pass the Eads and that the latter replied with a similar blast which lead Jones to think that he had the right to take his vessel past the Eads. McCullagh's defense is that he did not pass the Cadillac in the canal proper.

OBITUARY.

Thomas Head of 45 Wellington avenue, Windsor, Ont., died Wednesday at the age of 77 years. He was a retired lake captain and had lived in Windsor for many years. He is survived by three sons and one daughter.

Mr. C. P. Campbell of Buffalo, first mate of the steamer Lackawanna, was shocked to death by electricity at Green Bay last week. He was standing at the lookout at the bow of the steamer within a few feet of the bridge on which there was a net work of wire, among them a charged one belonging to the Green Bay Traction Co. In some manner his body came in contact with the wire and for an instant his entire person was enveloped in a blue flame. Mr. Campbell was about forty years old.

James A. Roche, Buffalo agent of the Detroit & Buffalo Line, died at the Detroit Sanitarium Tuesday night, where he had gone to have an operation performed, but owing to his condition he was not operated upon. He was one of the best known transportation men in Michigan. He was for many years connected with the Grand Trunk railway at Montreal, and later he was transferred to Detroit and continued his connection until 1902, after which he was appointed to the Buffalo agency of the Detroit & Buffalo Line. He is survived by a widow and one son.

Capt. Herriman of the Great Lakes Register was thrown from his automobile on Sunday and seriously injured. He is reported, however, as progressing favorably.

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OUR COASTWISE TRADE.

Supt. A. R. Smith of the Maritime Exchange of New York had in the coastwise issue of the Marine Review, published on Sept. 1, an article on the coastwise trade. It was impossible, however, in that issue to do strict justice to Mr. Smith's exposition of the trade owing to lack of space and the balance of his article is therefore published in the present issue. Mr. Smith's article clearly shows that there is room for improvement in the manner of keeping the maritime statistics of the country. Unfortunately there is no measure whatever of port to port commerce of the United States; nor is there any accurate measure of the undocumented tonnage of the United States. Following is the balance of the article:

Taking New York as the chief seaport, the number of steamships engaged in the coastwise trade are, naturally, by far the largest. The Mallory Line has a service to Galveston via Key West in which eight passenger and freight steamships are engaged, their net tonnage aggregating 21,000, besides which three additional steamships, of 6,500 net tons are engaged in service between New York and Mobile, these ships touching at Brunswick, Georgia. The Morgan Line, between New York and Galveston and between New York and New Orleans, employs fourteen freight steamships of 38,000 net tons, besides which three steamships of 8,000 net tons are employed by the same line in the carriage of both passengers and freight. The Ocean Steamship Co. of Savannah maintains a service of eight steamships, of 23,000 net tons for the carriage of both passengers and freight between New York and Savannah, besides which the company operates a 2,000-ton steamer in a service between Boston and Savannah. The Clyde Line employs seven passenger and freight steamships of 17,000 net tons, in their service between New York and Jacksonville, making intermediate calls at Charleston and Brunswick; two steamships of 2,500 net tons in a service between New York and Wilmington, North Carolina, and three steamships of 2,300 net tons in their service between New York and Philadelphia.

The Old Dominion Steamship Co. maintains a daily service to Norfolk and other ports on the Chesapeake Bay and its tributaries, employing seven passenger and freight steamships of 14,000 net tons. The Metropolitan Line between New York and Boston employs three steamships of 5,500 net tons, wholly engaged in the carriage of freight. The Maine Steamship Co. operates two steamships of about 2,000 net tons between New York and Portland, Me., carrying both passengers and freight. The New York and Baltimore Transportation Co. runs two steamers between Baltimore and New York, of 1,500 net tons. Then there are the Fall River and Providence and Stonington lines, the former employing eight passenger and freight steamers of 16,500 net tons and the latter employing six passenger and freight steamers of 10,000 net tons. In addition there are many other Long Island and Hudson River passenger and freight lines of steamboats. In the coastwise steamship lines mentioned the number of vessels has in many cases been doubled, and in some cases trebled, during the past twenty years, besides which there has been a steady increase in the tonnage of these ships, some of those now in use and of more recent construction, being double the size of those employed twenty years ago.

Since the discovery of practically unlimited deposits of oil in Texas a great and what seems to be a permanent trade has been built up, tank steamships and tank barges, the latter towed by the steamships, in considerable numbers being now steadily employed in carrying oil from Texas ports to New York and Philadelphia. As many as twenty-four steamships, with an aggregate net tonnage of 46,000, and barges aggregating 30,000 tons additional have been employed in the trade between Texas and Northern ports. Oil is also carried on the Gulf of Mexico from Texas to New Orleans, Galveston, and other ports, by small barges, probably some 5,000 tons of such vessels being so employed. Of course the great bulk of the oil carrying trade is done by or for the Standard Oil Co., which operates its own steamships and barges, and at times charters others for this purpose. The expense of fitting these vessels up for carrying oil in bulk is considerable, on account of which long-time contracts were made between the oil companies and the outside chartered steamships. In addition to the Standard Oil, the J. M. Guffey Petroleum Co. operate their own vessels and charter others in this trade, in addition to which chartered steamships owned by Lewis Luckenbach, by the Michigan Steamship Co., the Northwestern Steamship Co., under the active management in the case of the last two lines of Mr. James Jerone and Mr. D. H. E. Jones, of J. W. Elwell & Co., are employed. It is said that the oil companies are securing vessels of their own, in most cases by having them newly constructed and thoroughly adapted to the needs of their trade, and that before long the chartered oil carrying vessels will be entirely eliminated from the trade.

Outside of New York, the principal steamship lines engaged in the coastwise trade include the Boston & Philadelphia Steamship Co., which operates six steamships of 6,000 net tons between the two ports named, inclusive of a service that covers Providence and Fall River. The Merchants' & Miners' Transportation Co. operates lines between Boston, Baltimore and Savannah, and between Baltimore and Philadelphia, with nine steamships of 14,300 net tons, besides which there are important lines upon the Chesapeake Bay. The Ericsson Line maintains a daily service, inland, between Philadelphia and Baltimore, with five steamers of 2,100 net tons. A steamer of 1,060 net tons operates between Pensacola and Galveston, and a line of steamers connects the principal Florida coast ports.

Coal and lumber constitute the great bulk of schooner cargoes on the Atlantic and Gulf coasts. Phosphate forms a considerable proportion, but is now nearly all carried by steamers, although not of the regular lines. Ice from the New England, principally Maine, ports, goes in vast quantities to the South in sail vessels that bring back lumber and coal to the North and East.

The principal coastwise steamship lines are now carrying great quantities of lumber, which is forming a much larger proportion of their cargoes than ever before. The Morgan, Mallory and Clyde lines all participate in this trade, lumber frequently forming two-thirds of the entire cargo of their ships, notably those from the South Atlantic ports of the United States. Enormous quantities of "truck," consisting of early vegetables and fruit, constitute large portions of the cargoes of our coastwise steamships in season. Cotton is carried but little, proportionately, by these lines, that which goes to the port of New York being carried by the Morgan, Savannah and Clyde lines. The great staple of the Morgan and Mallory lines is sugar. In the carriage of canned California fruit, the Morgan Line, which is owned by the Southern Pacific Railroad Company, does a large business. Fresh fruit and "truck" is carried almost entirely by the Old Dominion Line, and it forms the bulk of their cargoes from Chesapeake Bay ports.

One of the important features of the Atlantic coastwise trade is the large number of barges and ocean-going tugboats that are employed, almost wholly in carrying coal, it being conservatively estimated that as many as 300,000 tons of such vessels are so employed. Many of these barges are old sailing ships that have been cut down, and the fleets of these barges of today contain some of the notable clippers of our earlier days, vessels that, having succumbed to the competition of foreign vessels, were sold for a song, and, it being impossible for their owners to operate them in the

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foreign trade at a profit, they have been turned into useful barges, and are still afloat, steadily employed. Of these 300,000 tons of barges a great many, especially those employed by the railroads, have been especially fitted for the trade, carrying coal from Delaware river and Chesapeake bay ports to New England ports. Their value is estimated at between $8,000,000 and $10,000,000. The principal owners are the Philadelphia & Reading, the Ontario & Western, the Delaware, Lackawanna & Western, and the Erie railroad companies; in addition the Consolidated Coal Co., the Staples Coal Co., and the Scully Towing Line are prominent in the coastwise coal barge trade. The great fleet established by Lewis Luckenbach is handled by his son Edgar F. Luckenbach. In addition to this purely ocean, or coastwise, barge coal carrying business, there is a large business conducted in smaller and less seaworthy vessels, that are employed between Northern New Jersey and Long Island Sound ports. About thirty powerful tugboats are employed in towing these barges along our coast. About 77,000 tons of barges, towed by four to six tugs, bring plaster from Nova Scotia to New York, and about 7,000 tons are employed in the lime trade.

A recently formed company employs 16,000 tons of newly and especially-built barges in carrying lumber from Florida to North Atlantic ports. Of course the barges are towed by ocean-going tugboats along the coast.

The 1889 census report on waterborne transportation reveals one fact very clearly indeed that is not generally appreciated, even by those directly engaged in waterborne transportation. We are so accustomed, year by year, to deal with the statistics of the documented shipping of the United States that we lose sight and quite overlook the importance of the number and tonnage of undocumented vessels. In 1889, for instance, we are told by the United States commissioner of navigation that "the amount of registered, enrolled, and licensed sailing and steam tonnage, constituting the total merchant marine of the United States," consisted of 23,623 vessels, of 4,307,475 gross tons, while the census compilation for the same year revealed the existence of 32,059 vessels of all kinds, of 8,603,489 gross tons. This shows that the actual total American tonnage in existence in 1889 embraced 8,436 vessels, of 4,296,014 gross tons, quite unaccounted for and not usually mentioned, or even remembered, when discussing the maritime resources of the United States.

It is proper, therefore, to reiterate, in order to emphasize, our regret that the great growth of our domestic traffic during the last fifteen years, in connection with which there must necessarily have been a corresponding growth in our facilities for the transportation of a large portion of this vast traffic by water, leaves us entirely in doubt and quite uninformed as to its extent—quite uninformed, indeed, as to its existence.

Having in mind, therefore, our previously made statement that the compilation of the marine statistics of the United States in the census year of 1889 does not permit of its separation in a manner to afford opportunity for presenting that engaged only in the coastwise trade, we come to the consideration of the report. This shows that in 1889 the total of all craft numbered 32,059, of 8,603,489 gross tons, having a commercial value of $220,774,250, which vessels moved 182,848,402 tons of freight and 169,857,927 passengers, exclusive of those carried on railroad ferries. These vessels earned $160,838,776, their expenses aggregating $130,257,970 and their net earnings amounting to $36,580,806. The ordinary crews of these vessels numbered 114,736 to whom were paid an average of $26.43 per month, or a total per year of $41,729,842 in wages. Of these vessels, 13,466, of 2,862,630 gross tons, valued at $127,676,487, were in the Atlantic and Gulf coasts divisions; they carried 80,695,665 tons of freight and 152,742,627 passengers; they earned $90,147,632, expended $70,226,792 and had a profit of $19,920,840; and they employed 63,625 in the ordinary crews of the vessels, to whom they paid $22,123,099 in wages. On the Pacific coast division there were 1,842 vessels, of 441,939 gross tons, valued at $23,067,370, which carried 8,818,363 tons of freight and 4,019,329 passengers, and they earned $20,628,316, expenses amounting to $17,247,809 and net earnings totaling $3,353,597; they employed 12,181 persons in their ordinary crews, to whom they paid $6,127,451 in wages. On the great lakes there were 2,784 vessels, of 926,355 gross tons, valued at $48,941,474, which carried 53,424,432 tons of freight and 2,235,993 passengers; they earned $35,636,163, their expenses being $28,033,651, net earnings amounting to $7,602,512; they also employed 22,934 persons in the ordinary crews, to whom were paid $8,140,430 in wages. On the rivers of the Mississippi valley there were 7,453 vessels, of 3,393,380 gross tons, valued at $15,335,005, which carried 29,405,046 tons of freight and 10,858,894 passengers; they earned $16,337,533, their expenses being $12,600,342, their net earnings totaling $3,737,191; they employed 15,006 persons in their ordinary crews to whom they paid $5,338,862 in wages. On the canals and canalized rivers there were 6,514 vessels, of 979,185 gross tons, valued at $5,753,914, which carried 10,504,896 tons of freight but no passengers; they earned $4,089,132, their expenses amounted to $2,122,376 and their net earnings were $1,966,756, there being no report of their crews nor the wages paid to them.

The total number of steam vessels in the United States was placed at 6,205, of 1,833,062, valued at $141,266,570, which earned $102,527,642 and paid in wages $26,056,988, the gross earnings showing an increase of 20 per cent over the census returns of 1880. These vessels employed 63,738 persons in their ordinary crews, to whom were paid $26,056,988 in wages. In the Atlantic and Gulf coast division there were 2,933 steamers, of 837,162 gross tons, valued at $73,554,540, which carried 28,791,438 tons of freight and earned $48,003,020, paying in wages to 25,653 persons $11,239,169. On the Pacific coast there were 531 steamers, of 170,503 gross tons valued at $15,526,455; they carried 5,741,940 tons of freight, earned $13,237,222, and paid to 6,818 persons $3,682,662 in wages. On the Great Lakes there were 1,489 steamers, of 599,949 gross tons, valued at $41,193,324, which earned $24,949,267 and paid to 15,271 persons $5,796,895 in wages. On the rivers of the Mississippi valley there were 1,114 steamers, of 210,772 gross tons, valued at $10,539,251, which carried 10,345,504 tons of freight, which earned $16,337,533 and paid to 15,996 persons $5,338,862 in wages. On the canals and the canalized rivers there were 138 steamers, of 14,676 gross tons, valued at $453,000.

The total number of sailing vessels was 8,917, of 1,797,071 gross tons, valued at $57,275,727, which are not reported fully as to other details. Of these there were 7,108 on the Atlantic and Gulf coasts, of 1,401,985 gross tons, valued at $46,284,509, which carried 39,801,533 tons of freight. On the Pacific there were 822 vessels, of 208,080 gross tons, valued at $6,715,570, which carried 2,761,826 tons of freight. On the Great Lakes there were 987 sailing vessels, of 187,006 gross tons, valued at $4,275,650, while there were no sailing vessels on the rivers of the Mississippi valley, or on the canals and canalized rivers.

The total number of unrigged craft was 16,037, of 4,973,356 gross tons, valued at $22,231,053, which were subdivided as follows: On the Atlantic and Gulf coasts, 3,425 of 623,483 gross tons, valued at $7,837,440, which carried 12,102,694 tons of freight; on the Pacific there were 489 vessels, of 63,356 gross tons, valued at $825,345, which carried 314,597 gross tons; on the Great Lakes there were 308 vessels, of 139,400 gross tons, valued at $3,472,500; on the rivers of the Mississippi valley there were 6,339 vessels of 3,182,608 gross tons, valued at $4,705,754, which carried 19,050,542 tons of freight; while on the canals and canalized rivers there were 6,376 vessels, of 964,509 gross tons, valued at $5,300,914, which carried 10,504,896 tons of freight.

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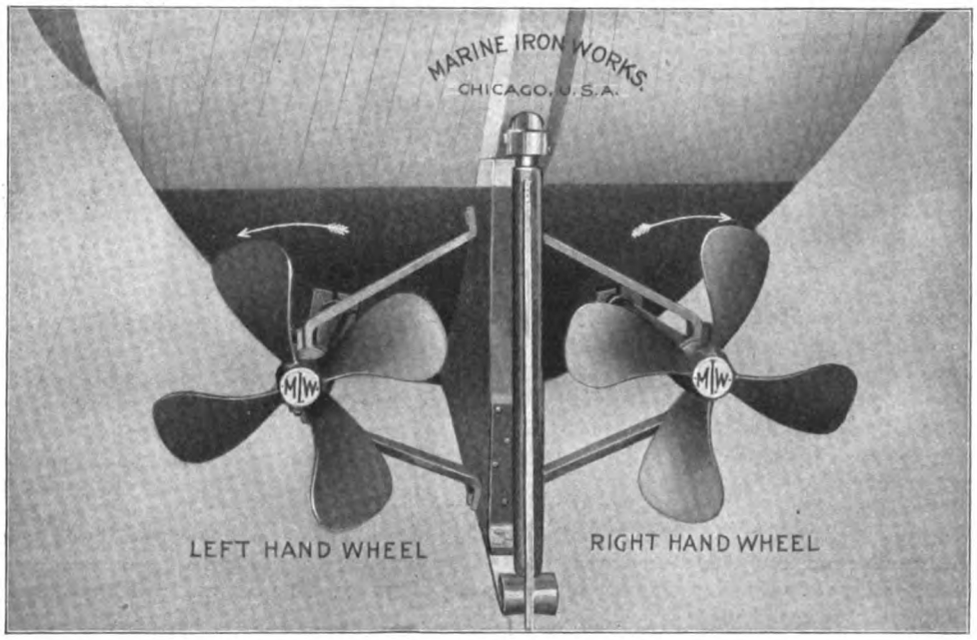
PROPELLER WHEELS FOR GASOLINE ENGINE.

While the Marine Iron Works of Chicago do not build or sell gasoline engines, they are designing and making propeller wheels. They have just issued an interesting circular concerning these wheels. The circular was put out practically in self-defense by the company, owing to the singular way in which propeller wheels are being ordered. The company calls the attention of buyers of propeller wheels to the following argument: A great many of the gasoline marine engines are made to revolve to the left when driving the boat ahead, and are known as "left-handed" engines. As a consequence the propeller wheels should be designed for turning to the left. In other words, the top blades turning to "port," or in the opposite direction to the hands of a clock, if one is standing behind the boat and looking ahead at the propeller wheel. This is just contrary to what is known as the "standard" propeller wheel for steam engines, and it is therefore of the utmost importance that the company should be notified whether a right or left-hand wheel is wanted in ordering. The accompanying illustration, taken from a photograph, shows both a right and left-hand wheel. The design of a speed propeller wheel for a gasoline engine is necessarily different from that for a steam engine. The former justifies a wheel suitable for a greater number of revolutions than is required by a steam engine of the same power and the degree of pitch, therefore, should be appreciably less.



PROPELLER WHEELS FOR GASOLINE ENGINES.

The company occasionally receives orders reading about as follows: "Send me a 28-in. speed propeller wheel by first express; don't delay." The company says in its circular: "No mention is made as to the number of blades, kind of engine, or whether a right or a left-hand wheel is wanted. If we were to fill such an order without further data, it would mean a 3-blade right-hand wheel with a 42-in. pitch, and would be correct for a launch driven by a modern steam engine. It might happen, however (and just such an instance recently occurred), that the wheel was wanted for a gasoline engine turning to the left when driving the boat ahead; result barely one-half the speed that should be attained and just as much fuel consumed. Many of the fastest gasoline launches in this country and abroad are fitted with propeller wheels from our patterns, and although we do not care to prescribe diameters of wheels for the several hundred different makes of gasoline engines, if buyers will name the diameter and be careful to specify whether it is a right or a left-hand design, we will take care of the rest and guarantee good results; but if any of these four important details are omitted we will not accept the responsibility. For all ordinary purposes, we recommend semi-steel propeller wheels as being the best, price considered, though phosphor bronze is tougher and, when polished, permits a slightly higher speed of boat."

The circular, which is quite expressive and which contains much information of value to intending purchasers of gasoline engines, will be sent to anyone upon request. It is well worth getting for the positive information which it possesses.

MOTOR BOAT QUEEN BESS.

One of the most remarkable boats for her class in and around New York city is the Queen Bess, owned by Capt. Richard H. Stearns of the Hotel Navarre, New York city. Motor boats of her class have found it impossible to beat her and she has been christened Championess. She was built from the designs of Mr. H. Newton Whittelsey, vice president and general manager of the Standard Boat Co. of Long Island City, and constructed by the Marine Construction & Dry Dock Co. in the spring of 1904, with which concern Mr. Whittelsey was at the time connected. For a continuity of winnings the Queen Bess holds the record. In five events given by the Columbia, Indian Harbor, Atlantic, Brooklyn and American Yacht Clubs, respectively, she took first prize, and in contests so far this year in which she was eligible she came off victorious in each case, with the exception of the meet of the American Yacht Club, when the Suis Moi beat her by about one minute, but which boat was afterward protested and the protest was upheld.

Capt. Stearns is the fleet captain of the Columbia Yacht Club, as well as a member of the Indian Harbor, Horseshoe Harbor and several other clubs. In all contests the captain always has from six to ten guests aboard while racing, and a more ardent supporter of the sport could not be found than is Capt. Stearns. The Queen Bess is 62 ft. over all, 51 ft. 7 in. on the water line, 11 ft. 6 in. beam, and equipped with a four-cycle, four-cylinder Standard motor of 20 nominal, but developing 27 H. P. She cleaves the water as gracefully as a swan.

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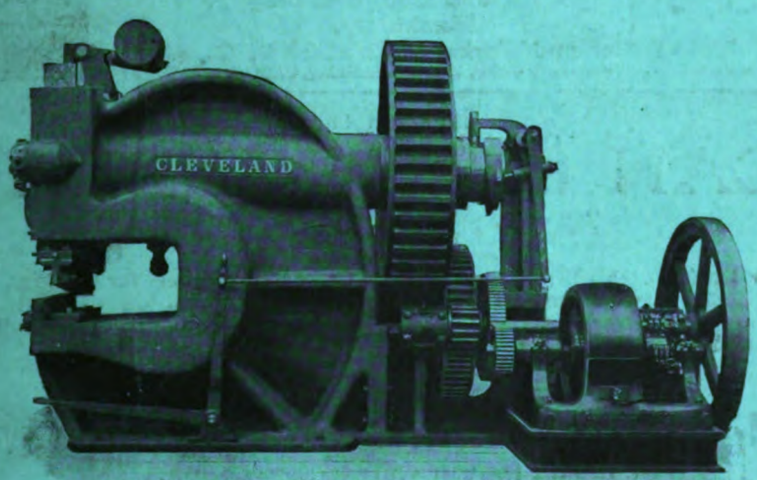

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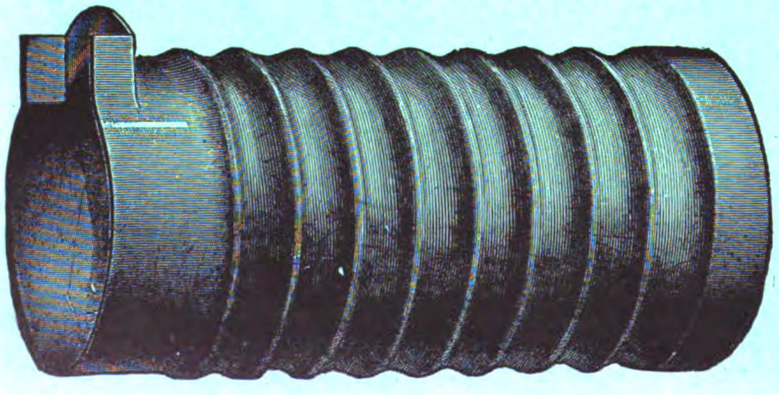

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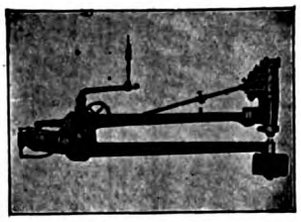

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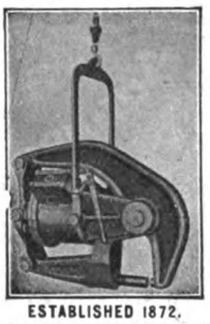

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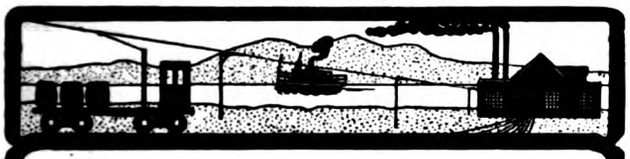

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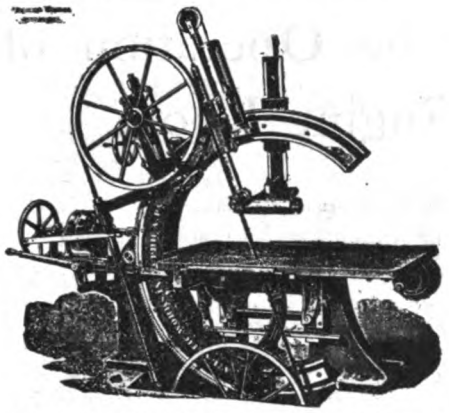

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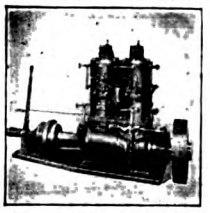

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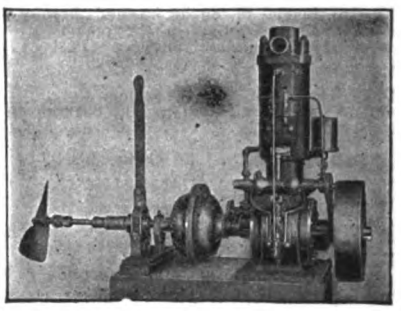

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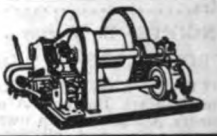

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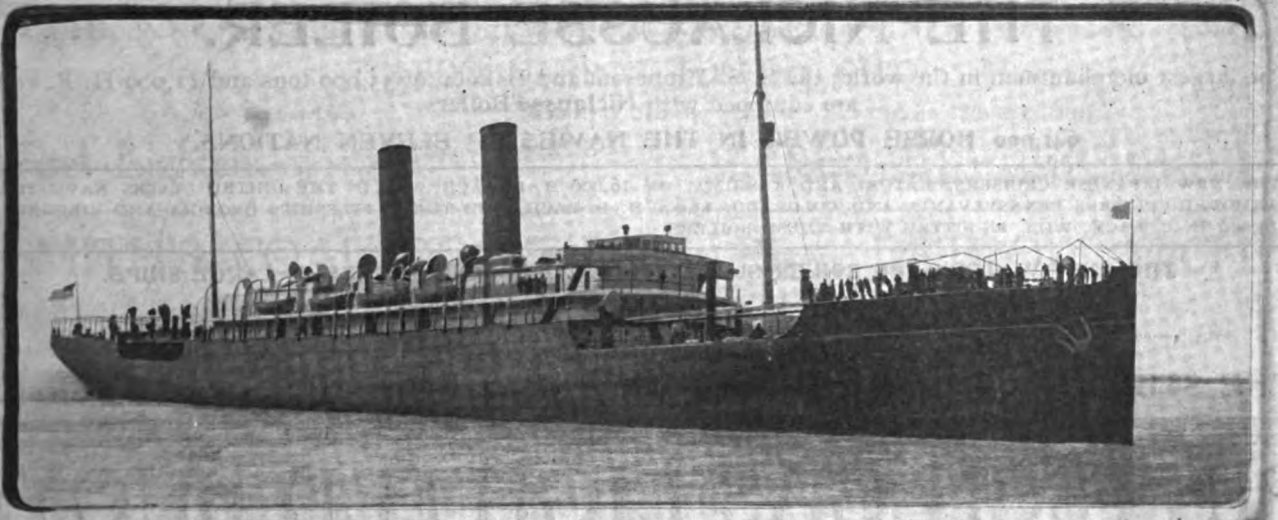

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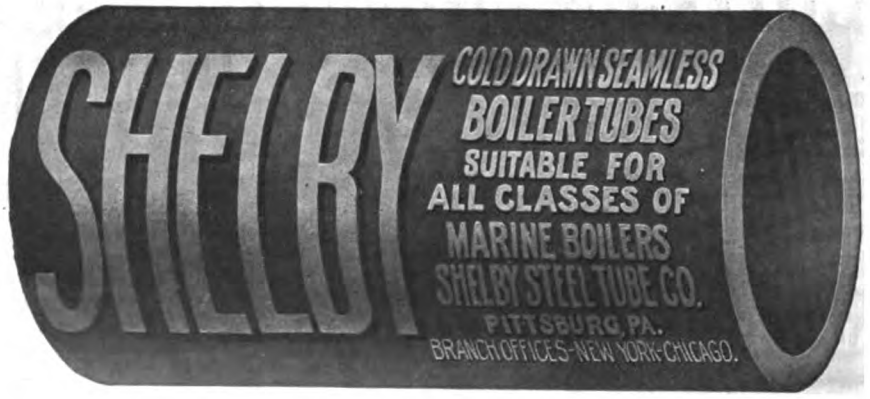

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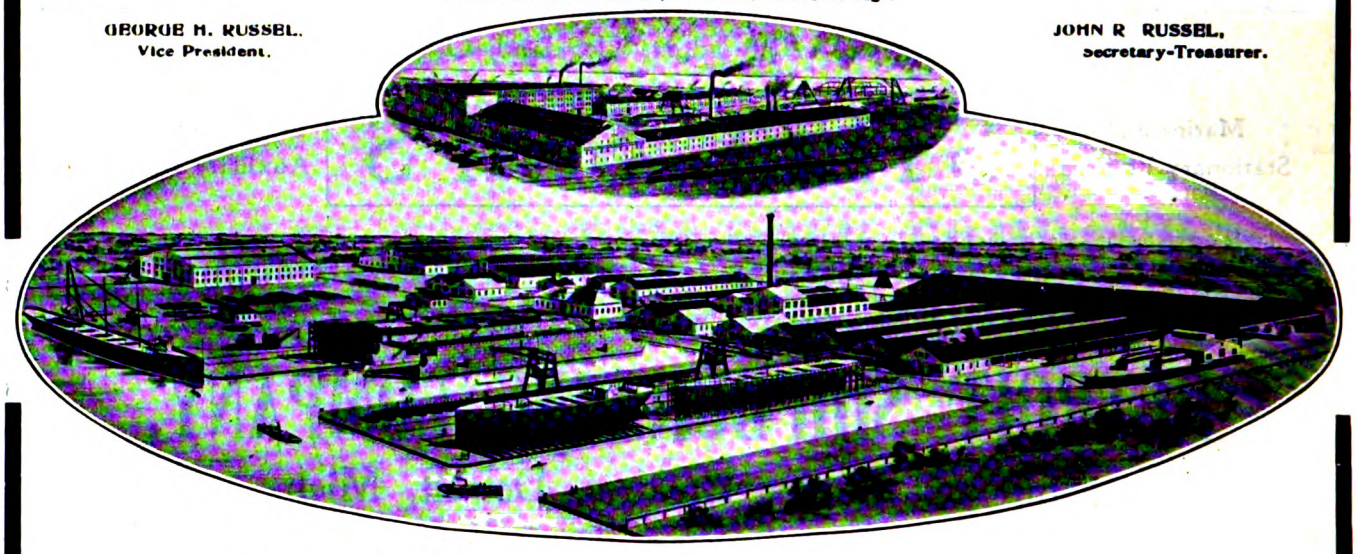

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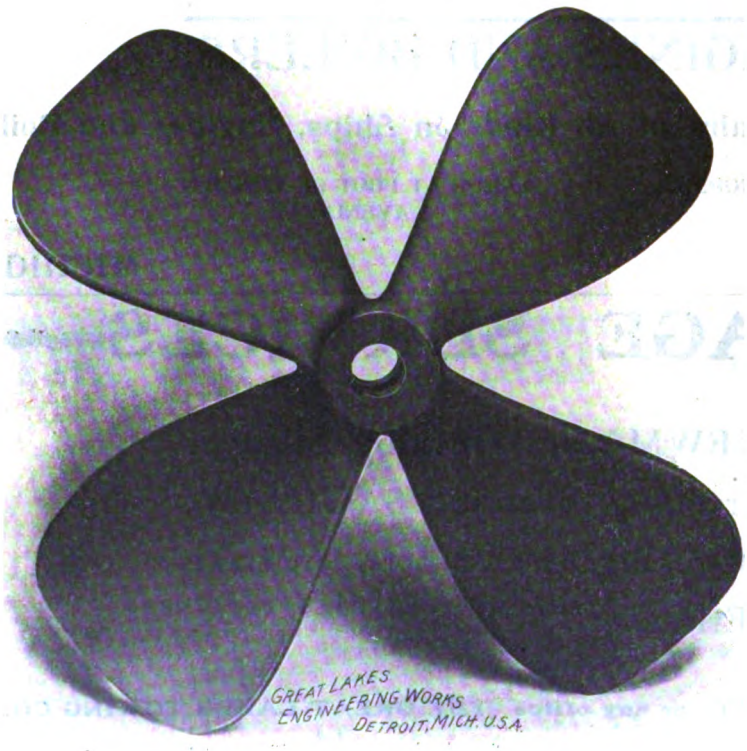

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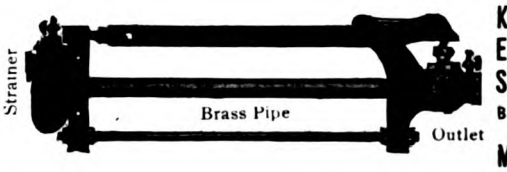

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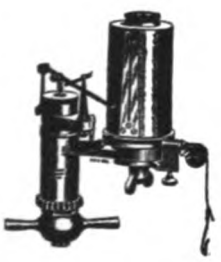

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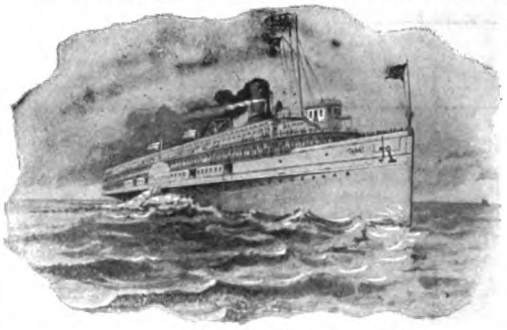

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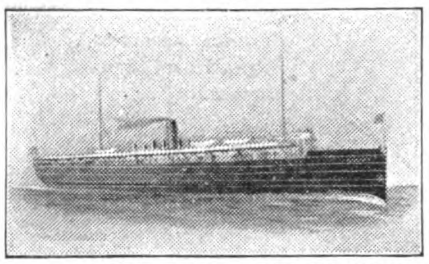

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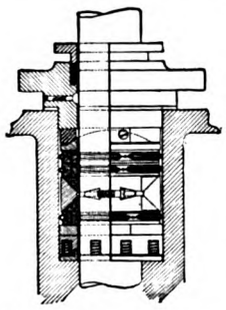

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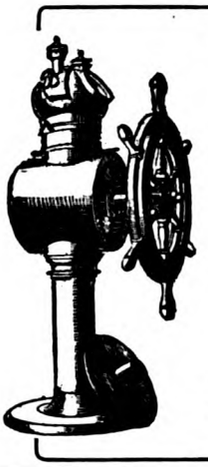

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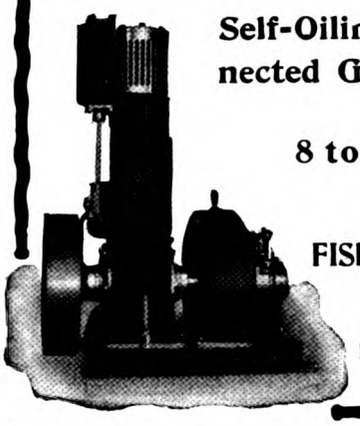

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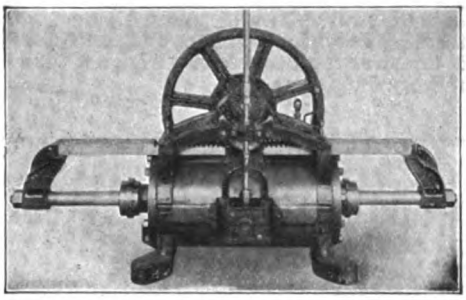

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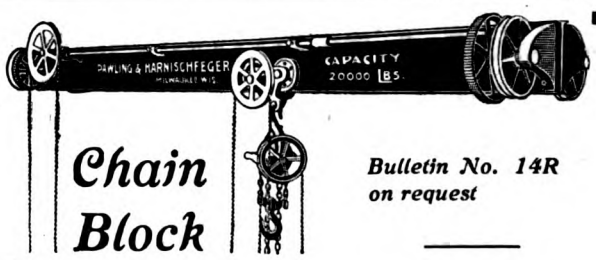

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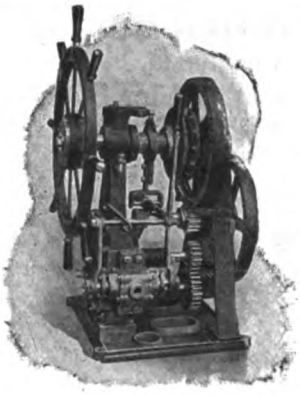

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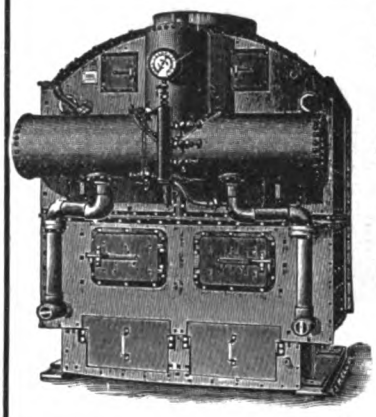

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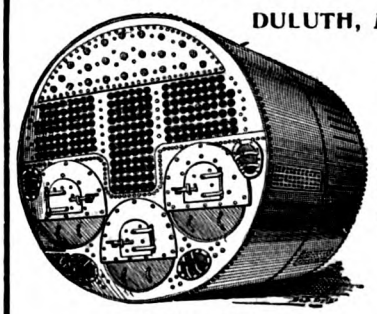

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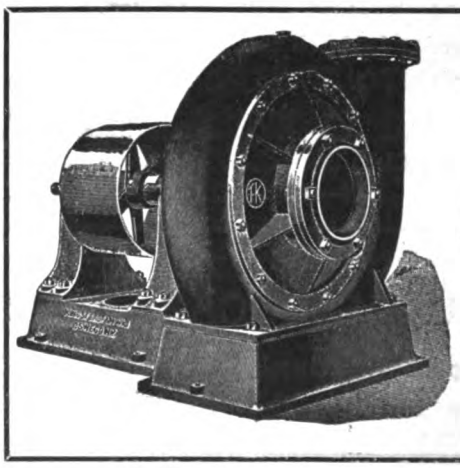

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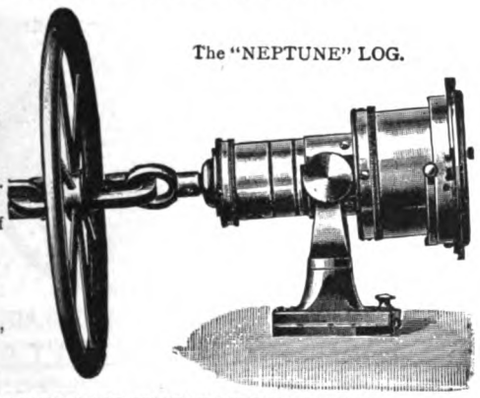

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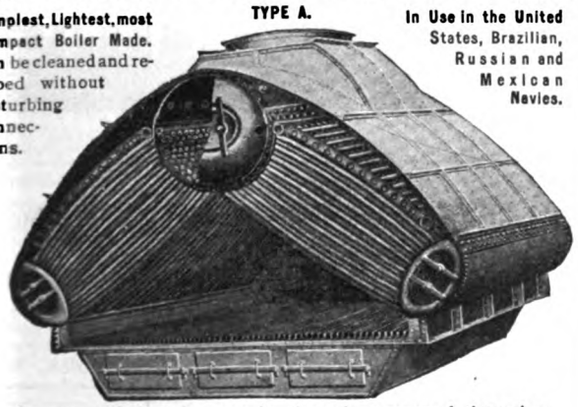

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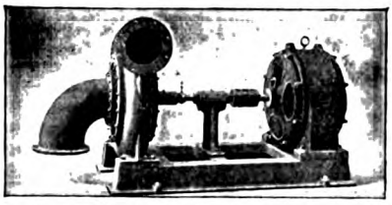

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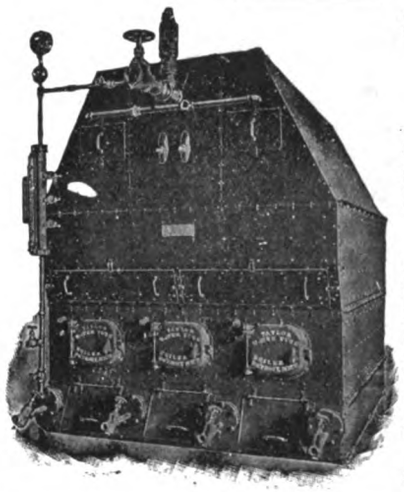

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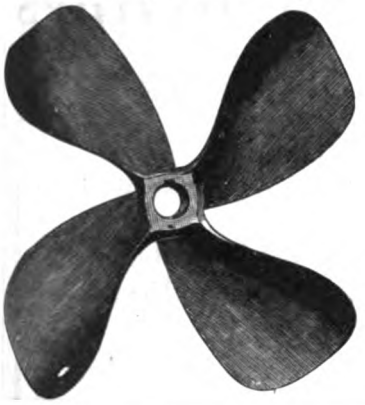

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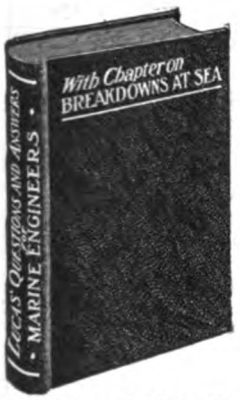

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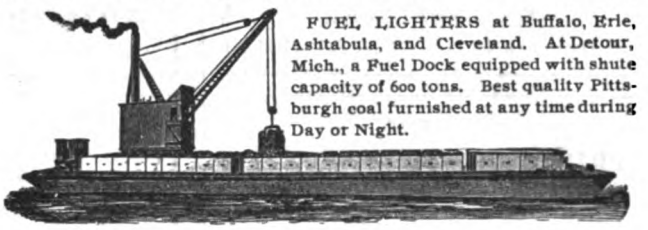

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NAVAL ARCHITECTS' AND ENGINEERS' DATA BOOK,
By T. H. WATSON.
Price, $1.50
THE PENTON PUB. CO.,
Cleveland, O.

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Buyers' Directory of the Marine Trade

For a more complete classification than that represented by advertisers in the Marine Review, see the BLUE BOOK OF AMERICAN SHIPPING, marine and naval directory of the United States, published by the Marine Review, 39-41 Wade Bldg., Cleveland.

See accompanying index of Advertisers for full addresses of concerns in this directory.

AIR COMPRESSORS, AIR HOISTS, ETC.
Dake Engine Co.....Grand Haven, Mich.
Great Lakes Engineering Works.....Detroit.
Mietz, Aug. .....New York.

AIR PORTS, DEAD LIGHTS, ETC.
Marine Mfg. & Supply Co.....New York.

AIR PUMPS AND APPLIANCES.
Fore River Ship & Engine Co..Quincy, Mass.
Great Lakes Engineering Works.....Detroit.

ANCHORS.
Baldt Anchor Co.....Chester, Pa.
Bowers, L. M. & Co.....Binghamton, N. Y.
DeGrauw, Aymar & Co.....New York.
Seaboard Steel Casting Co.....Chester, Pa.

ANTI-FOULING AND ANTI-CORROSIVE COMPOSITION FOR STEEL VESSELS.
Holzapfel's American Composition Co..New York.

ANTI-FRICTION METALS.
Cramp, Wm. & Sons.....Philadelphia.
Phosphor Bronze Smelting Co., Ltd.....
.....Philadelphia.
Victor Metals Co.....Braintree, Mass.

ARTIFICIAL DRAFT FOR BOILERS.
American Ship Building Co.....Cleveland.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Sturtevant, B. F., Co.....Hyde Park, Mass.

ASH EJECTORS.
Great Lakes Engineering Works.....Detroit.

ATTORNEYS AND PROCTORS IN ADMIRALTY.
Gilchrist, Albert J.....Cleveland.
Goulder, Holding & Masten.....Cleveland.
Hoyt, Dustin & Kelley.....Cleveland.
Kremer, C. E.....Chicago.
MacDonald, Ray G.....Chicago.
Potter & Potter .....Buffalo.
Shaw, Warren, Cady & Oakes.....Detroit.
White, Johnson, McCaslin & Cannon Cleveland.

BAROMETERS, MARINE GLASSES, ETC.
Ritchie, E. S. & Sons.....Brookline, Mass.

BELTING, RUBBER.
New York Belting & Packing Co....New York.

BLOCKS, SHEAVES, ETC.
Boston & Lockport Block Co....Boston, Mass.
Cleveland Block Co.....Cleveland.

BLOWERS.
Sturtevant, B. F. Co. .....Hyde Park, Mass.

BOAT BUILDERS.
Dreun, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, David.....New York.
Lane & DeGroot ....Long Island City, N. Y.
Marine Construction & D. D. Co.....
.....Mariner's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co....St. Joseph, Mich.
Willard, Chas. P. & Co.....Chicago.

BOILER COMPOUNDS.
Dearborn Drug & Chemical Works....Chicago.

BOILER MANUFACTURERS.
Almy Water Tube Boiler Co. Providence, R. I.
American Ship Building Co.....Cleveland.
Atlantic Works .....East Boston, Mass.
Babcock & Wilcox Co.....New York.
Bertram Engine Works Co., Ltd. .....
.....Toronto, Can.
Chicago Ship Building Co.....Chicago.
Cramp, Wm. & Sons.....Philadelphia.
Delauney, Belleville & Co..St. Denis, France.
Detroit Ship Building Co.....Detroit.
Fletcher, W. A. & Co.....Hoboken, N. J.
Fore River Shipbuilding Co.....Quincy, Mass.
Forest City Boiler Co.....Cleveland.
Georgian Bay Engineering Works.....
.... Midland, Ont.

BOILER MANUFACTURERS—Continued.
Gogebic Steam Boiler Works....Duluth, Minn.
Great Lakes Engineering Works.....Detroit.
Jenks Ship Building Co....Port Huron, Mich.
Kingsford Foundry & Machine Works....
.....Oswego, N. Y.
Milwaukee Dry Dock Co.....Milwaukee.
Mosher Water Tube Boiler Co....New York.
Newport News Ship Building Co.....
.....Newport News, Va.
Northwestern Steam Boiler & Mfg. Co....
..... Duluth, Minn.
Roberts Safety Water Tube Boiler Co....
..... New York.
Stirling, The Co.....Chicago.
Superior Ship Building Co....Superior, Wis.
Taylor Water Tube Boiler Co.....Detroit.
Union Machine & Boiler Co.....Cleveland.
United States Ship Building Co....New York.
Willard, Chas. P. & Co.....Chicago.

BOILER RIVETS.
Bourne-Fuller Co.. ....Cleveland.

BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.
Falls Hollow Staybolt Co..Cuyahoga Falls, O.

BRASS AND BRONZE CASTINGS.
Cramp, Wm. & Sons.....Philadelphia.
Fore River Ship & Engine Co..Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Lunkenheimer Co. .....Cincinnati.
Macbeth Iron Co.....Cleveland.
Phosphor Bronze Smelting Co....Philadelphia.
Victor Metals Co.....Braintree, Mass.

BRIDGES, BUILDERS OF.
Scherzer Rolling Lift Bridge Co....Chicago.

BUCKETS, ORE AND COAL.
Brown Hoisting & Conveying Machine Co.
..... Cleveland.
Forest City Boiler Co. .....Cleveland.
Macbeth Iron Co. .....Cleveland.

CABIN AND CABINET FINISHING WOODS.
Martin-Barriss Co.....Cleveland.

CAPSTANS.
American Ship Windlass Co..Providence, R. I.
Hyde Windlass Co.....Bath, Me.
Marine Mfg. & Supply Co.....New York.

CEMENT, IRON FOR REPAIRING LEAKS.
Smooth-On Mfg. Co.....Jersey City, N. J.

CHAINS.
Lebanon Chain Works.....Lebanon, Pa.

CHAIN HOISTS.
Boston & Lockport Block Co....Boston, Mass.
Dake Engine Co.....Grand Haven, Mich.

CHARTS.
Penton Publishing Co. ..... Cleveland.
Potter, J. D.....London.

CLOCKS (Marine and Ship's Bell) AND CHRONOMETERS.
Ashton Valve Co.....Boston.
Ritchie, E. S. & Sons.....Brookline, Mass.
Standard Gauge Mfg. Co.....Syracuse, N. Y.

COAL PRODUCERS AND SHIPPERS.
Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.

COAL AND ORE HANDLING MACHINERY.
Brown Hoisting Machinery Co. (Inc.) ..
..... Cleveland.
Macbeth Iron Co.....Cleveland.

COMPASSES.
Ritchie, E. S. & Sons.....Brookline, Mass.

COMPOSITIONS FOR SHIP'S BOTTOMS.
Holzapfel's American Compositions Co.New York.

CONCRETE MIXERS.
Contractors Supply & Equipment Co..Chicago.

CONDENSORS.
Great Lakes Engineering Works.. Detroit.
Thropp & Sons Co., John E....Trenton, N. J.

CONTRACTORS SUPPLIES.
Contractors Supply & Equipment Co., Chicago.

CONTRACTORS FOR PUBLIC WORKS.
Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co.
..... Chicago.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Hickler Bros. .....Sault Ste. Marie, Mich.
Lake Superior Contracting & Dredging Co..
.....Duluth, Minn.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H..Milwaukee.
Sullivan, M. .....Detroit.

CORDAGE.
Baker & Co., H. H.....Buffalo.
DeGrauw, Aymar & Co.....New York.
Upson-Walton Co.....Cleveland.

CORK JACKETS AND RINGS.
Armstrong Cork Co.....Pittsburg, Pa.
Kahnweiler's Sons, D.....New York.

COURSE FINDER.
Field's Patent Course Finder.....Cleveland.

CHAIN CONVEYORS, HOISTS.
Brown Hoisting Machinery Co. (Inc.)....
..... Cleveland.
General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co.....
.....Pittsburg, Pa.

CRANES, TRAVELING.
Brown Hoisting Machinery Co.....Cleveland.
Pawling & Harnischfeger.....Milwaukee.

DIVING APPARATUS.
Morse, A. J. & Son.....Boston.
Schrader's Son, A.....New York.

DREDGING CONTRACTORS.
Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co..
..... Chicago.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Hickler Bros. .....Sault Ste. Marie, Mich.
Lake Superior Contracting & Dredging Co..
.....Duluth, Minn.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H...Milwaukee.
Sullivan, M. .....Detroit.

DRYING APPARATUS.
Sturtevant, B. F., Co. .....Hyde Park, Mass.

DRY DOCKS.
American Ship Building Co.....Cleveland.
Atlantic Works .....East Boston, Mass.
Buffalo Dry Dock Co.....Buffalo.
Chicago Ship Building Co.....Chicago.
Craig Ship Building Co.....Toledo, O.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Lockwood Mfg. Co.....East Boston, Mass.
Manitowoc Dry Dock Co.....Manitowoc, Wis.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co.....
.....Newport News, Va.
Shipowners Dry Dock Co.....Chicago.
Superior Ship Building Co....Superior, Wis.
United States Ship Building Co....New York.

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Buyers' Directory of the Marine Trade.—*Continued.*

ELECTRIC HOISTS AND CRANES.

Fisher Electrical Works.....Detroit.
General Electric Co.....Schenectady, N. Y.
Pawling & Harnischfeger.....Milwaukee.
Westinghouse Electric & Mfg. Co.....
..... Pittsburg, Pa.

ELECTRIC LIGHT AND POWER PLANTS.

Fisher Electrical Works.....Detroit.
General Electric Co.....Schenectady, N. Y.
Mietz, Aug. .....New York.
Sturtevant, B. F. Co.....Hyde Park, Mass.
Thropp & Sons, John E.....Trenton, N. J.
Westinghouse Electric & Mfg. Co.....
..... Pittsburg, Pa.

ENGINE BUILDERS, MARINE.

American Ship Building Co.....Cleveland.
Atlantic Works .....East Boston, Mass.
Bertram Engine Works Co., Ltd. .....
..... Toronto, Can.
Chicago Ship Building Co.....Chicago.
Chase Machine Co.....Cleveland.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co.....Toledo, O.
Dake Engine Co.....Grand Haven, Mich.
Detroit Ship Building Co.....Detroit.
Fletcher, W. & A. Co.....Hoboken, N. J.
Fore River Shipbuilding Co.....Quincy, Mass.
Great Lakes Engineering Works Detroit, Mich.
Hall Bros. .....Philadelphia.
Jenks Ship Building Co....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Mietz, Aug. .....New York.
Milwaukee Dry Dock Co.....Milwaukee.
Mosher, Chas. D.....New York.
Moulton Steering Engine Co.....New York.
Newport News Ship Building Co.....
.....Newport News, Va.
Northwestern Steam Boiler & Mfg. Co....
.....Duluth, Minn.
Roach's Ship Yard .....Chester, Pa.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co....Superior, Wis.
Thropp, J. E. & Sons Co.....Trenton, N. J.
Trout, H. G.....Buffalo.
United States Ship Building Co....New York.
Willard, Chas. P. & Co.....Chicago.

ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.

Cory, Chas. & Son.....New York.
Marine Mfg. Supply Co.....New York.

ENGINEERING SPECIALTIES AND SUPPLIES.

Crane Co.....Chicago.
Kieley & Mueller .....New York.
Lunkenheimer Co. .....Cincinnati.
New York Belting & Packing Co..New York.
Northwestern Steam Boiler & Mfg. Co....
.....Duluth, Minn.

ENGINEERS, MARINE, MECHANICAL, CONSULTING.

Hynd, Alexander .....Cleveland.
Hunt, Robt. W. & Co.....Chicago.
Kidd, Joseph .....Duluth, Minn.
Lovejoy, H. O.....Buffalo.
Matteson & Drake .....Philadelphia.
Mosher, Chas. D.....New York.
Nacey, James .....Cleveland.
Pittsburg Testing Laboratory, Ltd...Pittsburg.
Rice, Henry .....Buffalo.
Roelker, H. B.....New York.
Sadler, Perkins & Field.....New York.
Steel, Adam .....Cleveland.
Wood, W. J. .....Chicago.

FANS FOR VENTILATION, EXHAUST, ETC.

Sturtevant, B. F. Co.....Hyde Park, Mass.

FEED WATER PURIFIERS AND HEATERS.

Ross Valve Co.....Troy, N. Y.

FIXTURES FOR LAMPS, OIL OR ELECTRIC.

General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co.....
.....Pittsburg, Pa.

FORGES.

Sturtevant, B. F. Co.....Boston.

FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.

Cleveland City Forge & Iron Co....Cleveland.
Fore River Shipbuilding Co.....Quincy, Mass.
Macbeth Iron Co.....Cleveland.

FLUE WELDING.

Fix's, S. Sons .....Cleveland.

FUEL ECONOMIZERS.

Sturtevant Co , B. F.....Hyde Park, Mass.

FUELING COMPANIES AND COAL DEALERS.

Hanna, M. A. & Co.....Cleveland.
Ironville, Dock & Coal Co.....Toledo, O.
Parker Bros. Co., Ltd.....Detroit.
Picklands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.
Smith, Stanley B., & Co.....Detroit,
Smith Coal & Dock Co., Stanley B.Toledo, O.

FURNACES FOR BOILERS.

Continental Iron Works.....New York.

GASKETS, RUBBER.

New York Belting & Packing Co..New York.

GAS BUOYS.

Safety Car Heating & Lighting Co..New York.

GAS AND GASOLINE ENGINES.

Chase Machine Co.....Cleveland.
Georgian Bay Engineering Works.....
..... Midland, Ont.
Reliance Mfg Co..... City Island, New York.
Temple Pump Co.....Chicago.

GAUGES, STEAM AND VACUUM.

American Steam Gauge & Valve Mfg. Co.
..... Boston.
Ashton Valve Co.....Boston.
Lunkenheimer Co. .....Cincinnati.
Standard Gauge Mfg. Co.....Svracuse, N. Y.

GAUGES, WATER.

Bonner & Co., Wm. T.....Boston.
Lunkenheimer Co. .....Cincinnati, O.
Standard Gauge Mfg. Co.....Syracuse, N. Y.

GRAPHITE.

Dixon Crucible Co., Joseph..Jersey City, N. J.

HAMMERS, STEAM.

Chase Machine Co.....Cleveland.

HEATING APPARATUS.

Sturtevant, B. F. Co.....Hyde Park, Mass.

HOISTS FOR CARGO, ETC.

American Ship Building Co.....Cleveland.
Brown Hoisting Machinery Co. (Inc.)....
..... Cleveland.
Chase Machine Co.....Cleveland.
General Electric Co.....New York.
Georgian Bay Engineering Works.....
..... Midland, Ont.
Hyde Windlass Co.....Bath, Me.
Marine Iron Co.....Bay City.
Mietz, Aug. .....New York.
Pawling & Harnischfeger .....Milwaukee.
Westinghouse Electric & Mfg. Co.....
.....Pittsburg, Pa.

HOLLOW STAYBOLT IRON.

Falls Hollow Staybolt Co...Cuyahoga Falls, O.

HOSE, RUBBER.

New York Belting & Packing Co..New York.

HYDRAULIC DREDGES.

Great Lakes Engineering Works.....Detroit.

HYDRAULIC TOOLS.

Watson-Stillman Co., The.....New York.

ICE MACHINERY.

Great Lakes Engineering Works.....Detroit.
Roelker, H. B.....New York.

INDICATORS FOR STEAM ENGINES.

American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.

INJECTORS.

American Injector Co.....Detroit.
Crane Co. .....Chicago.
Jenkins Bros. .....New York.
Lunkenheimer Co. .....Cincinnati.
Penberthy Injector Co.....Detroit, Mich.

INSURANCE, MARINE.

Elphicke, C. W. & Co.....Chicago.
Fleming & Co., P. H.....Chicago.
Frankfort Marine, A. & P. G. Ins. Co....
..... New York.

INSURANCE, MARINE—Continued.

Gilchrist & Co., C. P.....Cleveland.
Hawgood & Co., W. A.....Cleveland.
Helm & Co., D. T.....Duluth.
Hutchinson & Co.....Cleveland.
McCarthy, T. R.....Montreal.
McCurdy, Geo. L.....Chicago.
Mitchell & Co.....Cleveland.
Parker Bros. Co., Ltd.....Detroit.
Peck, Chas. E. & W. F..New York & Chicago.
Prindiville & Co.....Chicago.
Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.
Voss, F. D.....New York.

IRON ORE AND PIG IRON.

Bourne Fuller Co.....Cleveland. O.
Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Georgian Bay Engineering Works.....
..... Midland, Ont.
Marine Construction & D. D. Co.....
.....Mariner's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Willard, Chas. P.....Chicago.

LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong, Cork Co.....Pittsburg.
Drein, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, D. .....New York

LIGHTS, SIDE AND SIGNAL.

Russell & Watson .....Buffalo.

LOGS.

Walker & Sons, Thomas ....Birmingham, Eng.
Also Ship Chandlers.

LUBRICATING GRAPHITE.

Dixon Crucible Co., Joseph..Jersey City, N. J.

LUBRICATORS.

Crane Co. .....Chicago.
Lunkenheimer Co. .....Cincinnati.

LUMBER.

Martin-Barriss Co.....Cleveland.

MACHINISTS.

Chase Machine Co.....Cleveland.
Gogebic Steam Boiler Works....Duluth, Minn.
Hickler Bros. .....Sault Ste. Marie, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Union Machine & Boiler Co.....Cleveland.

MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc.....Philadelphia.

MARINE RAILWAYS.

Hickler Bros. .....Sault Ste. Marie, Mich.

MARINE GLUE.

Ferdinand & Co., L. W.....Boston, Mass.

MARINE RAILWAYS, BUILDERS OF.

Crandall & Son, H. I....East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W.....New York.

MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works ..Detroit.
Sturtevant, B. F. Co.....Hyde Park, Mass.

MELTING POT AND PAYING LADLE.

(For Paying Seams of Decks with Marine Glue.)

Ferdinand & Co., L. W.....Boston.

METALLIC PACKING.

Katzenstein, L. & Co.....New York.

METAL POLISH.

Bertram's Oil Polish Co.....Boston

MOTORS, GENERATORS—ELECTRIC.

Fisher Electrical Works.....Detroit.
General Electric Co.....Schenectady, N. Y.
Sturtevant, B. F. Co.....Hyde Park, Mass.
Westinghouse Electric & Mfg. Co.....
..... Pittsburg, Pa.

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NAUTICAL INSTRUMENTS.
Ritchie, E. S., & Sons.....Brookline, Mass.

NAVAL ARCHITECTS.
Hynd, Alexander .....Cleveland.
Kidd, Joseph.....Duluth, Minn.
Lovejoy, H. O.....Buffalo.
Matteson & Drake.....Philadelphia.
Mosher, Chas. D.....New York.
Nacey, James .....Cleveland.
Rice, Henry .....Buffalo.
Sadler, Perkins & Field.....New York.
Steel, Adam .....Cleveland.
Wood, W. J.....Chicago.

OAKUM.
DeGrauw, Aymar & Co.....New York.
Stratford, Oakum Co.....Jersey City, N. J.

OIL ENGINES.
Mietz, Aug. .....New York.

OILS AND LUBRICANTS.
Dixon Crucible Co., Joseph..Jersey City, N. J.
Standard Oil Co.....Cleveland.

PACKING.
Crane Co. .....Chicago.
Jenkins Bros. .....New York.
Katzenstein, L. & Co.....New York.
New York Belting & Packing Co...New York.

PACKING TOOL.
Matteson & Drake .....Philadelphia.

PAINTS.
Baker, Howard H. & Co.....Buffalo.
Detroit Varnish Co.....Detroit.
Detroit White Lead Works.....Detroit.
New Jersey Zinc Co.....New York.
Upson-Walton Co. .....Cleveland.

PATTERN SHOP MACHINERY.
Atlantic Works, Inc.....Philadelphia.

PILE DRIVING AND SUBMARINE WORK.
Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co..
..... Chicago.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Hickler Bros. .....Sault Ste. Marie, Mich.
Lake Superior Contracting & Dredging Co.,
.....Duluth, Minn.
Parker Bros. Co., Ltd.....Detroit.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H...Milwaukee.
Sullivan, M. .....Detroit.

PIPE, WROUGHT IRON.
Bourne-Fuller Co.....Cleveland, O.
Crane Co. .....Chicago.
Macbeth Iron Co.....Cleveland.

PLANING MILL MACHINERY.
Atlantic Works, Inc.....Philadelphia.

PLATES—SHIP, STRUCTURAL, ETC.
Bourne-Fuller Co.....Cleveland, O.
Otis Steel Co.....Cleveland.

PNEUMATIC TOOLS.
Allen, John F.....New York.

POLISH FOR METALS.
Bertram's Oil Polish Co.....Boston.

PRESSURE REGULATORS.
Kieley & Mueller .....New York.
Ross Valve Co.....Troy, N. Y.

PROPELLER WHEELS.
American Ship Building Co.....Cleveland.
Atlantic Works .... East Boston, Mass.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Fore River Shipbuilding Co Quincy, Mass.
Great Lakes Engineering Works.. Detroit.
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co.....
.....Newport News, Va.
Phosphor Bronze Smelting Co., Ltd.....
..... Philadelphia.
Roelker, H. B.....New York.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co....Superior, Wis.
Thropp & Sons Co., J. E.....Trenton, N. J.
Trout, H. G.....Buffalo.
United States Ship Building Co....New York.

PROJECTORS, ELECTRIC.
General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co.....
..... Pittsburg, Pa.

PUMPS FOR VARIOUS PURPOSES.
Blake, Geo. F., Mfg. Co.....New York.
Great Lakes Engineering Works Detroit.
Kingsford Foundry & Machine Works....
..... Oswego, N. Y.

PUNCHES, RIVETERS, SHEARS.
Allen, John F. .....New York.

RANGES.
Russell & Watson .....Buffalo

REFRIGERATING APPARATUS.
Great Lakes Engineering Works.....Detroit.
Roelker, H. B. .....New York.

REGISTER FOR CLASSIFICATION OF VESSELS.
Great Lakes Register .....Cleveland.
Record of American & Foreign Shipping..
.....New York.

REPAIRS—ENGINE AND BOILER.
(See also Boiler Manufacturers and Engine Builders.)
Georgian Bay Engineering Works.....
.....Midland, Ont.
Gogebic Steam Boiler Works....Duluth, Minn.
Forest City Boiler Co.....Cleveland.
Marine Iron Co.....Duluth, Minn.

RIVETING MACHINES.
Allen, John F.....New York.

RIVETS, STEEL FOR SHIPS AND BOILERS.
Bourne-Fuller Co.....Cleveland, O.

SAFETY VALVES.
American Steam Gauge & Valve Mfg. Co.
..... Boston.
Ashton Valve Co.....Boston.
Crane Co. .....Chicago.
Lunkenheimer Co. .....Cincinnati.

SAIL MAKERS.
Baker, Howard H. & Co.....Buffalo.
Upson-Walton Co.....Cleveland.
Wilson & Silsby .....Boston.

SALVAGE COMPANIES.
See Wrecking Companies.

SEARCH LIGHTS.
General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co.....
.....Pittsburg, Pa.

SHEARS.
See Punches, Rivets, and Shears.

SHIP AND BOILER PLATES AND SHAPES.
Bourne Fuller Co.....Cleveland, O.
Otis Steel Co.....Cleveland.

SHIP BUILDERS.
American Ship Building Co.....Cleveland.
Atlantic Works .....East Boston, Mass.
Bertram Engine Works Co., Ltd.Toronto, Can.
Buffalo Dry Dock Co.....Buffalo.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co.....Toledo, O.
Chicago Ship Building Co.....Chicago.
Detroit Ship Building Co.....Detroit.
Fore River Shipbuilding Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Jenks Ship Building Co....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Manitowoc Dry Dock Co.....Manitowoc, Wis.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co.....
.....Newport News, Va.
Roach's Ship Yard .....Chester, Pa.
Shipowner's Dry Dock Co.....Chicago.
Smith & Son, Abram.....Algonac, Mich.
United States Ship Building Co..New York.
Willard, Chas. P. & Co.....Chicago.

SHIP CHANDLERS.
Baker, Howard H. & Co.. .....Buffalo.
Marine Mfg. & Supply Co.....New York.
Upson-Walton Co.....Cleveland.

SHIP LANTERNS AND LAMPS.
Russell & Watson .....Buffalo.

SHIP TIMBER.
Martin-Barriss Co.....Cleveland.

SMOOTH-ON COMPOUND, FOR REPAIRS.
Smooth-On Mfg. Co.....Jersey City, N. J.

STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.
Falls Hollow Staybolt Co..Cuyahoga Falls, O.

STEAM VESSELS FOR SALE.
Gilchrist & Co., C. P. .....Cleveland.
Holmes, Samuel .....New York.
Lester, S. S. ..... Quebec, Can.
McCarthy, T. R.....Montreal, Can.

STEAMSHIP LINES, PASS. AND FREIGHT.
American Line .....New York.
Anchor Line .....Buffalo.
Boston Steamship Co.....Boston.
Cleveland & Buffalo Transit Co.....Cleveland.
Detroit & Cleveland Line.....Cleveland.
Erie & Western Trans. Co.....Buffalo.
Goodrich Trans. Co.....Chicago.
International Mercantile Marine Co.....
..... Philadelphia.
Manitou Steamship Co.....Chicago.
Mexican-American S. S. Co..New Orleans, La.
New York & Cuba Mail S. S. Co.....New York
Niagara, St. Catharines & Toronto Ry. & Nav. Co. .....St. Catharines, Ont.
Northern Michigan Trans. Co.....Chicago.
Red Star Line .....New York.
Richelieu & Ontario Nav. Co.....Montreal, Can.
United Fruit Co .....Boston.

STEEL CASTINGS.
Macbeth Iron Co.....Cleveland.
Otis Steel Co.....Cleveland.

STEERING APPARATUS.
American Ship Building Co.....Cleveland.
Chase Machine Co.....Cleveland.
Dake Engine Co.....Grand Haven, Mich.
Detroit Ship Building Co.....Detroit.
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co....Port Huron, Mich.
Marine Mfg. & Supply Co.....Cleveland.
Moulton Steering Engine Co.....New York.
Pawling & Harnischfeger .....Milwaukee.
Sheriffs Mfg. Co.....Milwaukee.

SUBMARINE DIVING APPARATUS.
Morse & Son, A. J.....Boston.
Schrader's Son, A.....New York.

SURVEYORS, MARINE.
Gaskin, Edward .....Buffalo.
Hynd, Alexander .....Cleveland.
Lovejoy, H. O.....Buffalo.
Matteson & Drake .....Philadelphia.
Parker Bros. Co., Ltd.....Detroit.
Nacey, James .....Cleveland.
Rice, Henry .....Buffalo.
Steel, Adam .....Cleveland.
Wood, W. J.....Chicago.

TESTS OF MATERIALS.
Hunt, Robert W. & Co.....Chicago.
Pittsburg Testing Laboratory, Ltd....Pittsburg.

TILING, INTERLOCKING RUBBER.
New York Belting & Packing Co...New York.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.
Allen, John F.....New York.
Watson-Stillman Co.....New York.

TOOLS, WOOD WORKING.
Atlantic Works, Inc.....Philadelphia.

TOWING MACHINES.
American Ship Windlass Co..Providence, R. I.
Chase Machine Co.....Cleveland.

TOWING COMPANIES.
Donnelly Salvage & Wrecking Co.....
.....Kingston, Ont.
Great Lakes Towing Co.....Cleveland.
Midland Towing & Wrecking Co., Ltd....
.....Midland, Ont.

TRAPS, STEAM.
Kieley & Mueller .....New York.
Lunkenheimer Co. .....Cincinnati.
Sturtevant Co., B. F., ...Hyde Park, Mass.

TRUCKS.
Boston & Lockport Block Co.....Boston.

TUBING, SEAMLESS.
Shelby Steel Tube Co.....Pittsburg, Pa.

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Ashton Valve Co. ..... Boston.
Crane Co. ..... Chicago.
Jenkins Bros. ..... New York.
Kieley & Mueller ..... New York.
Lunkenheimer Co. ..... Cincinnati.
Ross Valve Co. ..... Troy, N. Y.

VALVES FOR WATER AND GAS.

Ross Valve Co. ..... Troy, N. Y.

VARNISHES.

Detroit Varnish Co. ..... Detroit.
Detroit White Lead Works. ..... Detroit.
New Jersey Zinc Co. ..... New York.
Also Ship Chandlers.

VENTILATING APPARATUS FOR SHIPS.

Sturtevant, B. F. Co. ..... Hyde Park, Mass.

VESSEL AND FREIGHT AGENTS.

Boland, John J. ..... Buffalo.
Brown & Co. ..... Buffalo.
Elphicke, C. W. & Co. ..... Chicago.
Fleming & Co., P. H. ..... Chicago.
Gilchrist & Co., C. P. ..... Cleveland.
Hall & Root ..... Buffalo.
Helm & Co., D. T. ..... Duluth.

VESSEL AND FREIGHT AGENTS—Con.

Hawgood & Co., W. A. ..... Cleveland.
Holmes, Samuel ..... New York.
Hutchinson & Co. ..... Cleveland.
Lester, S. S. ..... Quebec, Can.
McCarthy, T. R. ..... Montreal.
Mitchell & Co. ..... Cleveland.
Parker Bros. Co., Ltd. ..... Detroit.
Prindiville & Co. ..... Chicago.
Richardson, W. C. ..... Cleveland.
Sullivan, D. & Co. ..... Chicago.

WATER GAUGES.

Bonner & Co., Wm. T. ..... Boston
Lunkenheimer Co. ..... Cincinnati, O.

WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co. ..... Buffalo.
DeGrauw, Aymar & Co. ..... New York.
Upson-Walton Co. ..... Cleveland.

WHISTLES, STEAM.

American Steam Gauge & Valve Mfg. Co. ..... Boston.
Ashton Valve Co. ..... Boston.
Lunkenheimer Co. ..... Cincinnati.

WINDLASSES.

American Ship Windlass Co. . Providence, R. I.
American Ship Building Co. ..... Cleveland.
Hyde Windlass Co. ..... Bath, Me.
Jenks Ship Building Co. ... Port Huron, Mich.
Marine Mfg. & Supply Co. ..... New York.

WINCHES.

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Georgian Bay Engineering Works. ..... Midland, Ont.
Hyde Windlass Co. ..... Bath, Me.

WOOD WORKING MACHINERY.

Atlantic Works, Inc. ..... Philadelphia.

WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co. ..... Kingston, Ont.
Great Lakes Towing Co. ..... Cleveland.
Midland Towing & Wrecking Co., Ltd. ..... Midland, Ont.
Parker Bros. Co., Ltd. ..... Detroit.

YACHT AND BOAT BUILDERS.

Bertram Engine Works Co., Ltd. . Toronto, Can.
Drein, Thos. & Son. ..... Wilmington, Del.
Georgian Bay Engineering Works. ..... Midland, Ont.
Truscott Boat Mfg. Co. ..... St. Joseph, Mich.
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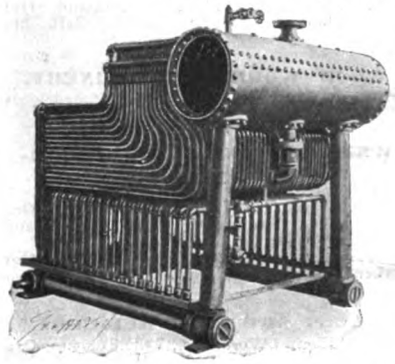

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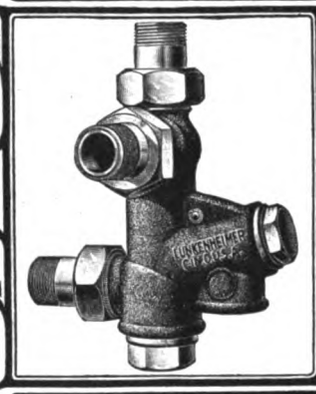

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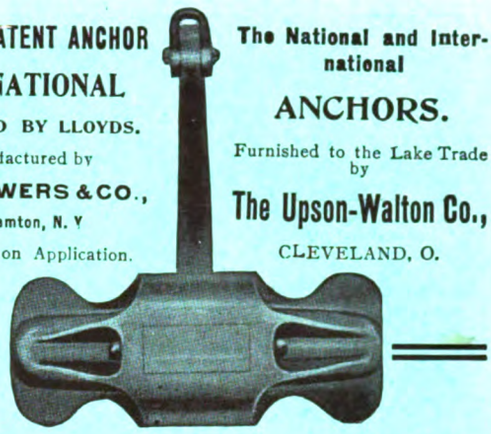

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No. 22, Lake Shore Limited.. ..	*2:12 a.m.	*2:20 a.m.
No. 20, Chicago and Cleveland Exp.	*7:20 a.m.	.....
No. 28, New York and Boston Exp..	*7:40 a.m.	*8:00 a.m.
No. 40, Toledo and Buffalo Accom ..	†10:00 a.m.	†10:30 a.m.
No. 32, Fast Mail	*11:25 a.m.	*11:30 a.m.
No. 48, Accommodation via Sandusky	†1:40 p.m.	.....
No. 42, Boston-New York Express .	.....	*11:45 a.m.
No 44, Cleveland and New York Spl.	.....	*3:00 p.m.
No. 46, Southwestern Express		*3:10 p.m.
No. 116, Ashtabula Accommodation.	....	†4:30 p.m.
No. 6, Limited Fast Mail	*5:40 p.m.	*5:45 p.m.
No. 26, 20th Century Limited.....	*7:40 p.m.	*7:43 p.m.
No. 10, Chicago, N.Y. & Boston Spl.	*7:30 p.m.	*7:50 p.m.
No. 16, New England Express.....	*10:30 p.m.	*10:35 p.m.
No. 2, Day Express	†9:10 p.m.	†9:25 p.m.
No. 126, Norwalk Accommodation .	†7:55 a.m.	.....

Westward	Arrive from East	Depart West
No. 7, Exposition Limited.....	*12:50 a.m.	.....
No. 11, Southwestern Limited.....	*2:55 a.m.	.....
No 9, Day Express		†6:10 a m.
No. 15, Boston and Chicago Special.	*3:10 a.m.	*3:15 a.m.
No. 19, Lake Shore Limited	*7:15 a.m.	*7:25 a.m.
No. 23, Western Express.....	*10:30 a.m.	*10:35 a m.
No. 29, Southwestern Special.....	‡11:10 a.m.	.....
No. 33, Southwestern Express	*12:25 p.m.	.....
No. 133, Cleveland and Detroit Exp.	.....	*12:45 p.m.
No. 47, Accommodation	†11:00 a.m.	†3:00 p m.
No. 141, Sandusky Accommodation .	.....	†3:10 p m.
No. 43, Fast Mail..... ...	*4:35 p.m.	*4:40 p.m.
No. 127, Norwalk Accommodation ..	.....	†5:10 p.m.
No. 37, Pacific Express	*6:50 p.m.	*7:20 p m.
No. 3, Fast Mail Limited.... .	*10.50 p.m.	*10:55 p.m.
No 115, Ashtabula Accommodation.	*8.30 a.m.	.....

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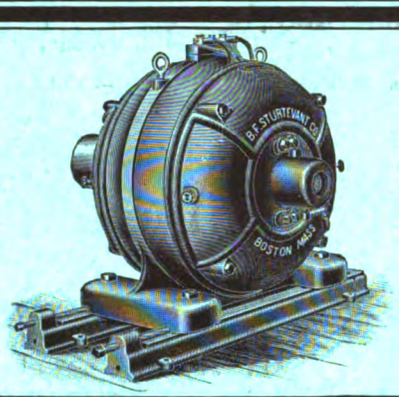

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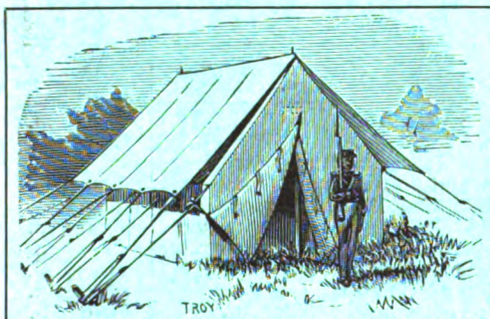

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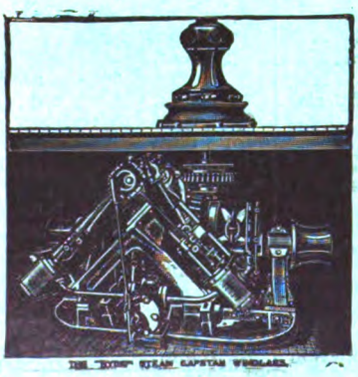

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